ANNUAL REVIEW AND CONVENTION NUMBER

PAPER TRADE JOURNAL

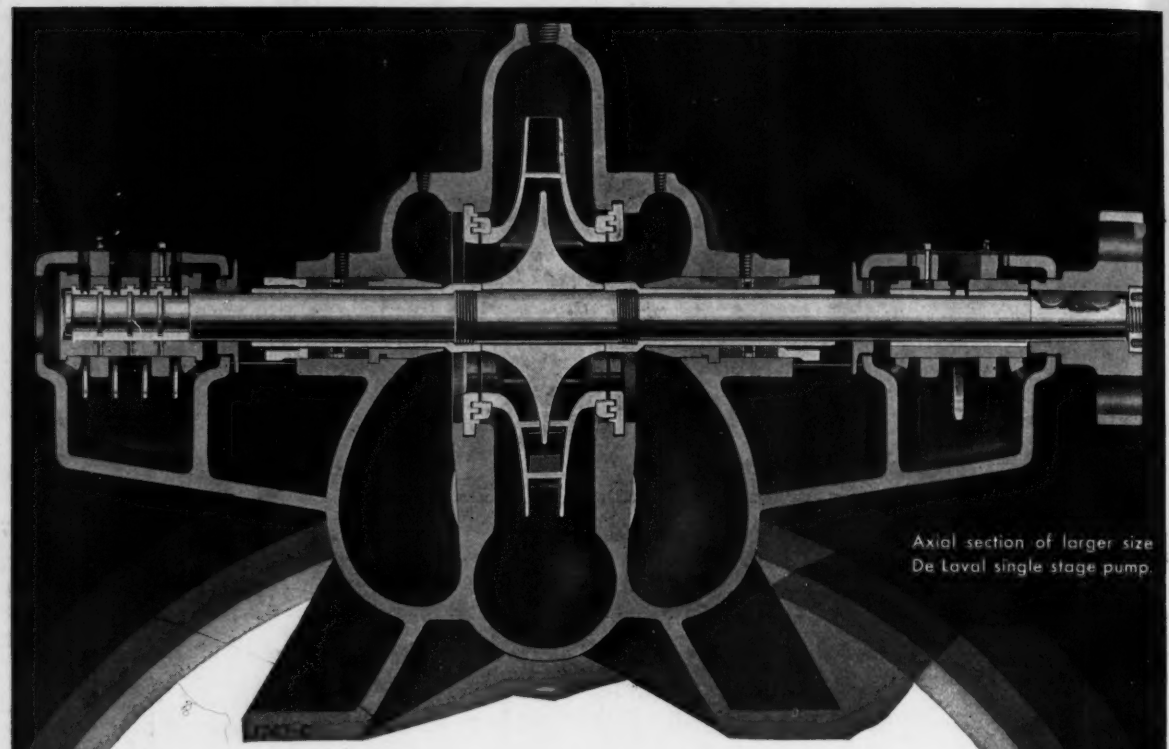
Vol. XCIV FEBRUARY 18, 1932 No. 7

Wood Pulp

JOHANESON, WALES & SPARRE, INC.

250 PARK AVE. NEW YORK, N.Y.

TEL. ELDORADO 5-6053



Axial section of larger size De Laval single stage pump.

DE LAVAL
LABYRINTH SEALING RINGS
Reduce Leakage and Wear

ONE of the greatest energy losses in centrifugal pumps is that due to leakage from the discharge to the suction chamber, particularly where high pressures are generated. Plain cylindrical or radial clearances at the points of leakage must be very close in order to hold the leakage within reasonable limits, but such close clearances are soon increased by erosion or by wear due to metallic contact caused by whipping. De Laval Labyrinth Wearing Rings, however, can be given three times as much clearance as can flat rings for the same leakage, and will wear many times as long as will flat rings for a given percentage increase in leakage. The De Laval Labyrinth Rings can, when necessary, be replaced quickly and inexpensively by new rings made to limit gages on an interchangeable basis.

DE LAVAL
STEAM TURBINE COMPANY
Trenton, New Jersey

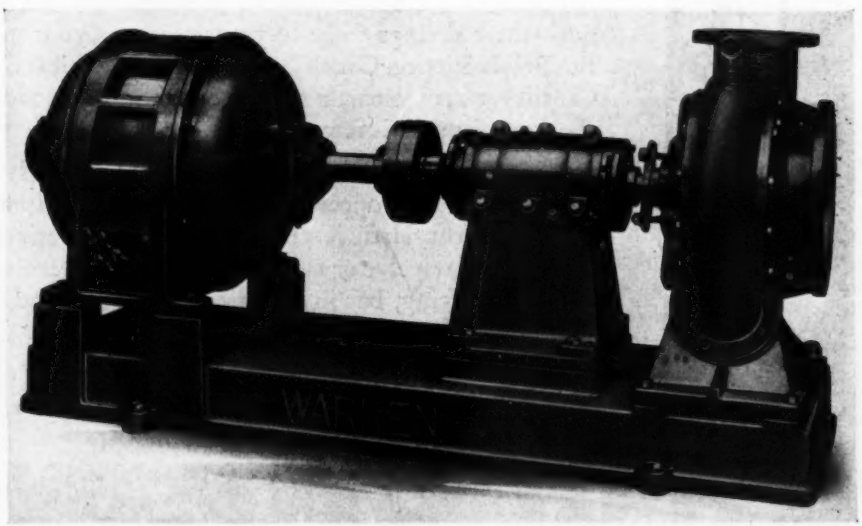
Entered as second class matter March 3, 1925, at the Postoffice at East Stroudsburg, Pa., under the Act of Congress of March 3, 1879. Published every Thursday by the Lockwood Trade Journal Co. at 34 N. Crystal St., East Stroudsburg, Pa. Executive and Editorial Offices: 10 E. 39th St., New York, N. Y.

One by one, builders of stuff pumps have adopted details of design and construction originally developed by Warren engineers.

But a Warren Stuff Pump is still the only one which has all of the "Warren" advantages.

Meantime, our engineers continue to get their feet wet and clothes spattered with pulp working out new developments under actual mill conditions.

If you want the latest, most dependable stock handling equipment, get in touch with Warren.



WARREN PUMPS

Warren Steam Pump Co., Inc. **Warren, Massachusetts**

Agencies in all principal cities

No more "cigarette holder" or crane . . . . .

Beloit Suction Couch Rolls
Cantilever Feature Avoids
Heavy Lifting—Saves Time
Prevents Damaged Wires

WHEN putting on a new wire, no longer is the "cigarette holder" required. No longer is there a need for using a crane. Heavy lifting is eliminated, valuable time saved—damaged wires prevented—wire life extended and wire changes speeded up. Smoother operation is always noted. It makes no difference whether your machine is a Removable Fourdriner or not—these savings come to you as soon as your machine is equipped with the Beloit Suction Couch Roll, because all Beloit Suction Couch Rolls have Cantilever rear journals to support the roll in overhanging position when the front support is removed for putting on a new wire.

It is surprising what a transformation the Beloit Suction Couch Roll will make in any mill operating with old-type equipment in other ways, too. Scores of enthusiastic letters received from Superintendents and mill managers, testify to twelve or more unusual benefits received, not only in eliminating heavy lifting, but in increased production and operating economies.

It will pay you to get the facts. A letter brings complete details and a copy of the Suction Roll Manual to you without cost or obligation.

The *Beloit* Way is the *Modern* Way

BELOIT IRON WORKS, BELOIT, WIS., U. S. A.

The BELOIT

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Undercut Trimmers

Paper Machines
Fourdrinier
Cylinder

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Jordans

Stuff and Fan Pumps

1828-1932

104

YEARS of SERVICE

Builders of the first American Fourdrinier Machine . . holders of the original Jordan Patents . . pioneers in Paper Bag Machinery . . today, still leading the way.

On your next job call in a S. & W. mill engineer — no obligation.

THE SMITH & WINCHESTER MFG. CO.

South Windham, Connecticut

— No Smith & Winchester Machine Has Ever Worn Out —

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HAMBLET ROTARY PAPER CUTTERS

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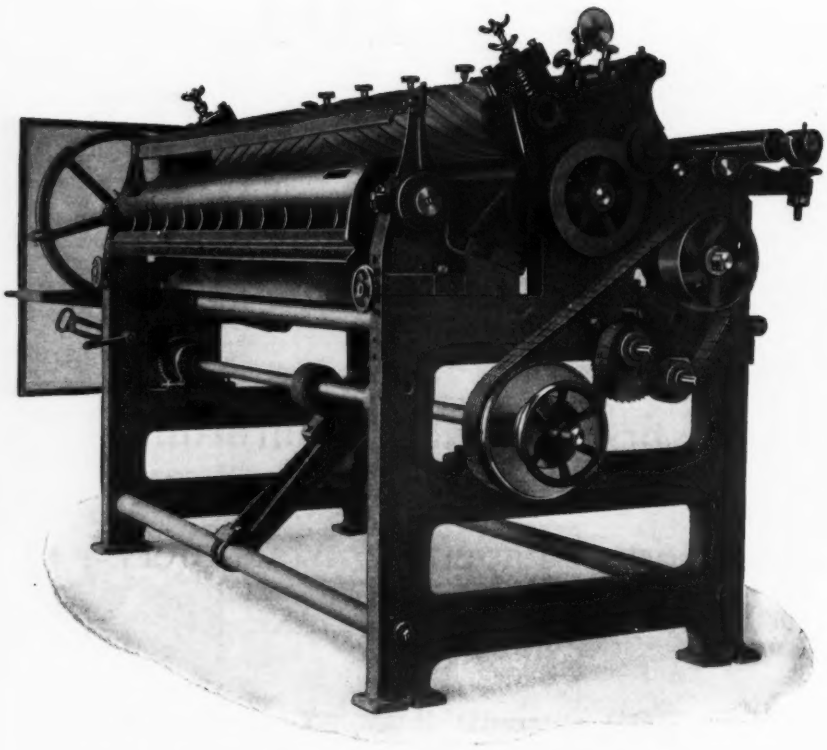
IN MORE THAN FIVE HUNDRED MILLS

THERE'S A REASON!



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Lay-Boys
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For Any Number
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ROLLER BEARING CUTTER

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ESPECIALLY DEVELOPED

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IT IS HARD–

Harder than steel, nine-tenths as unyielding as the diamond—consequently most strongly resistant to all forms of wear and abrasion.

IT IS NON-CORROSIVE–

CRODON plate forms an impervious protection against corrosion—its bright, clean surface never tarnishes.

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Greatly reduced friction is experienced with CRODON-plated parts—contacting parts glide smoothly over a highly-polished surface with but relatively slight wear—neither solids nor liquids adhere to chromium plate.

IT IS ACCURATE–

Precision-finished parts are accurately maintained within close tolerances—reduced wearing action provides absolute accuracy for several times normal life.

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IT IS OF UNIVERSAL APPLICATION–

Actual operating economies are usually many times the cost of CRODON plating—longer life, fewer operating delays, avoidance of equipment changes and replacements—all contribute to the achievement of lower costs.

IT IS AN IMPROVEMENT OF PRODUCT–

Improved and *maintained* quality of product is assured—clean, accurate, long-lived CRODON-plated parts mean better quality of finished product, at lower cost.

The trade-mark CRODON assures the best in chromium plate

Can you afford *not* to obtain the economies made possible by the correct application of CRODON plate? Let us show you what has already been accomplished, and what CRODON can do for you. Write for Bulletin No. 6, describing applications in the paper industry.

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During all this time as paper making processes changed, developed and improved so have Appleton Felts. Today—as they were 40 years ago—Appleton Felts are standard for design, quality and service.

Appleton Felts are made for each customer—to meet the requirements of that particular mill. The use of Appleton Felts is your assurance of quality and service.

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Appleton
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WRAPPING
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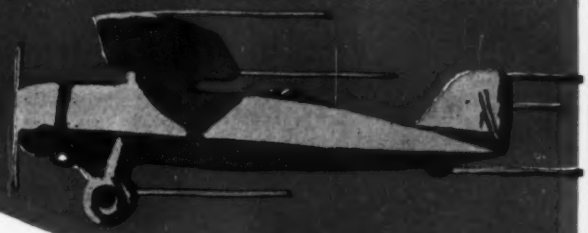
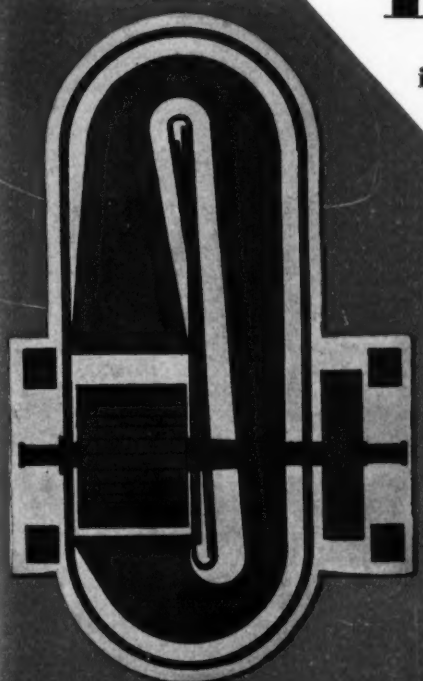


Today

"stream-lining" is a feature of Dilts Beaters. The stock circulates naturally. There is no obstruction; no dead spot; no "eddy." The hydrating and beating is uniform and very thorough. Every dollar spent on power goes into the making of paper.

Today

it is performance that you demand of your beaters. In Dilts beaters you get *super-performance.*



–Dilts–
MACHINE WORKS, Inc.
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"YOUR PAPER IS MADE IN YOUR BEATERS"

A "Puseyjones"

Variable Pitch Fourdrinier

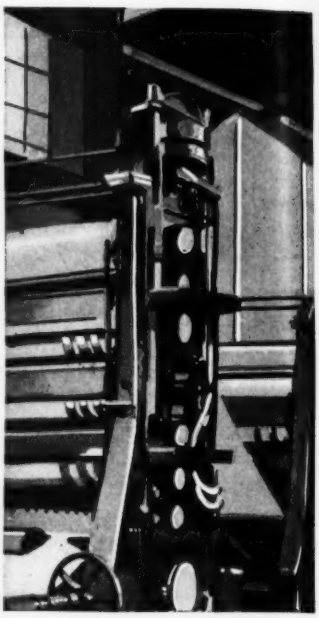
permits higher speeds
remarkable flexibility

Book paper makers who find "orders that should be theirs" going elsewhere might well look to their Fourdriniers.

If they are the old "stationary" affairs that went out of date along with big profits now is the time to rebuild and modernize them.

With a "Puseyjones" Fourdrinier whose pitch can be instantly changed to any desired degree *while the machine is in operation,* together with an equally broad range of control over the speed and throw of the shake head your production will show a gratifying improvement in quantity, quality and variety.

Write us for complete details and cost of these profit-making improvements.



THE PUSEY AND JONES CORPORATION

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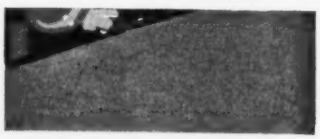
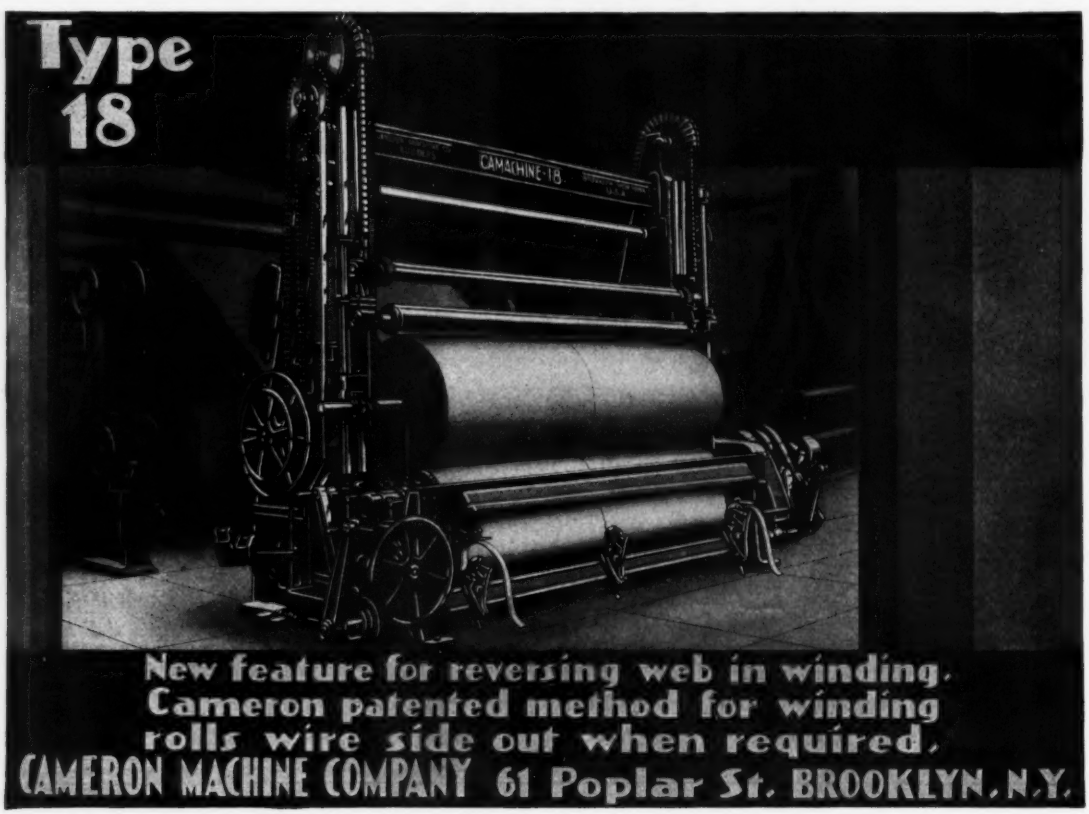
DELAWARE, U. S. A.

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CAMACHINE-18
New feature for reversing web in winding.
Cameron patented method for winding
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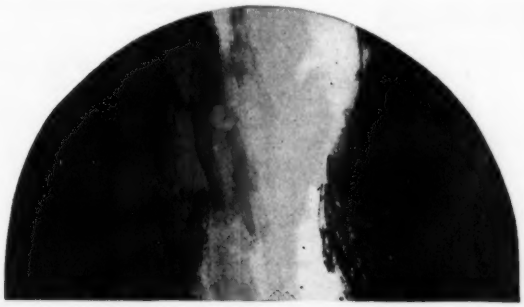
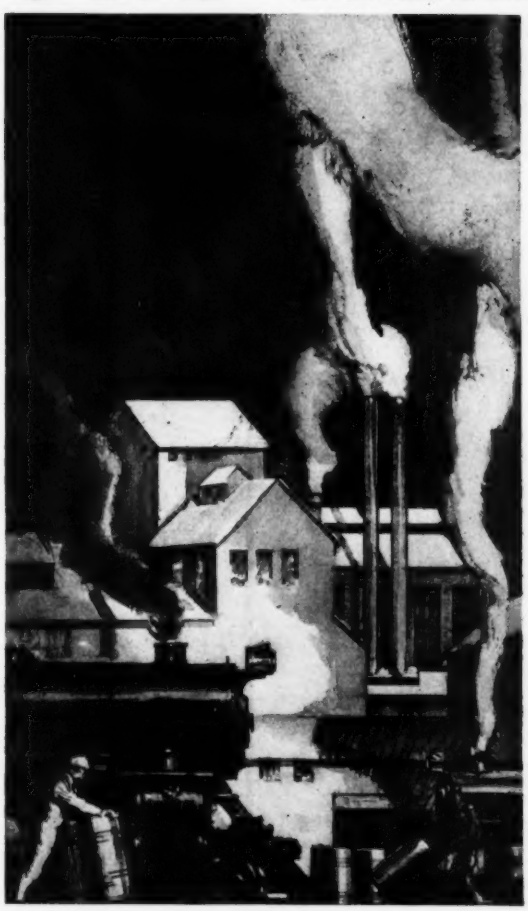
CAMERON MACHINE COMPANY 61 Poplar St. BROOKLYN, N.Y.



DIAMOND ALKALIES



DIAMOND Alkalies are to industry what salt is to mankind . . . a vitally essential element. Many industrial plants must have a never failing supply and the quality *must* be unvarying.

Diamond appreciates this responsibility and has met the challenge . . . our chemical processes have been refined by years of constant improvement . . . no effort has been spared to attain and maintain the highest standard of quality and purity . . . why you can specify Diamond with the utmost confidence.

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MILLS AT
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Competitive offerings convince you that your mill is not obtaining the best coloring results;

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Command NATIONAL SERVICE to solve these problems.

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NATIONAL ANILINE & CHEMICAL COMPANY, Inc.

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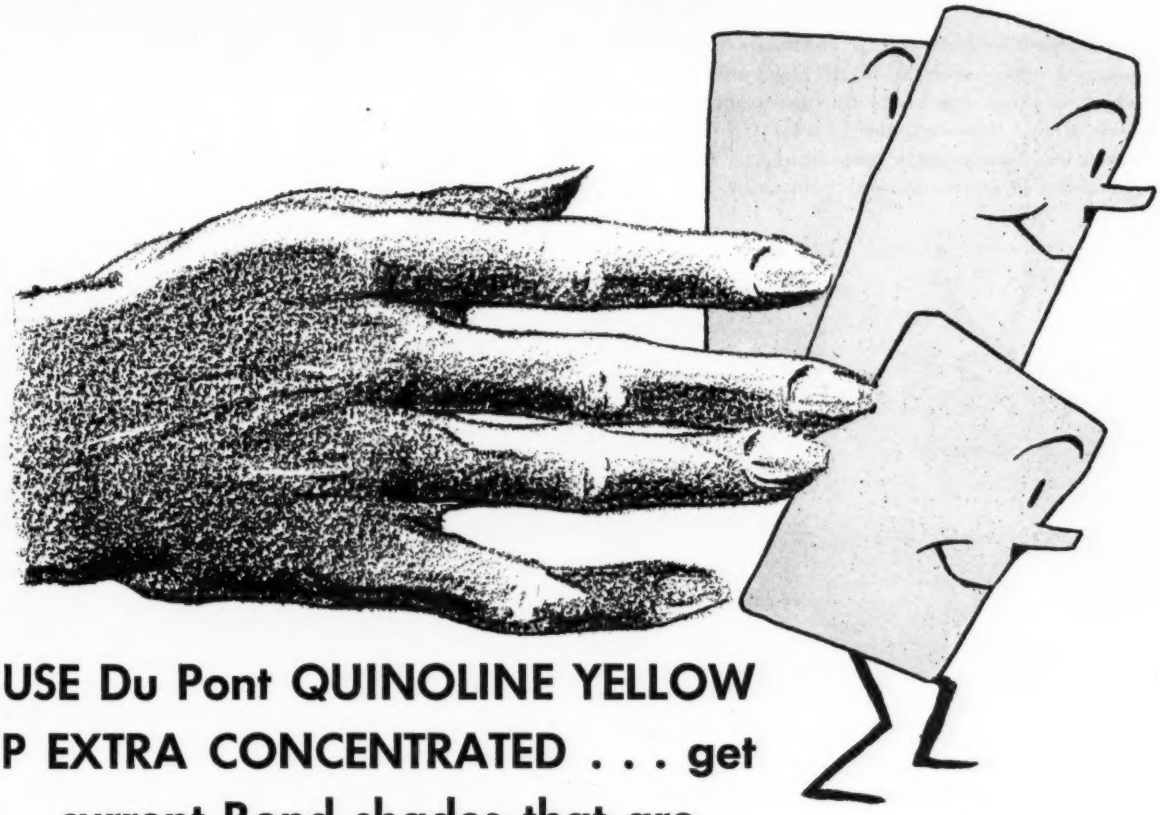
PAPER DYES

NATIONAL DYES

Do FAST-TO-LIGHT YELLOWS Elude You?



USE Du Pont QUINOLINE YELLOW P EXTRA CONCENTRATED . . . get current Bond shades that are fast to light.

Quinoline Yellow P Extra Conc. is used as a self color and in combination with other colors to produce many current fast-to-light Bond shades.

Our technical department is always at your service to help solve your paper dyestuffs problems.

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Du Pont DYES for PAPER

Let us help you *fight* the CORROSION PROBLEM

To assist you with sulphite or other corrosion problems, Duriron engineers have developed alloy steels of high resistance, from which castings are made to your own design. And their thorough-going advisory service based on twenty years' experience in fighting corrosion is always at your command.

The success of special alloy steel castings made by The Duriron Company is due to the use of induction furnaces, by which the carbon content can be absolutely controlled. Consequently, the carbon content is kept low, from .04% to .07%, resulting in greater resistance to sulphite liquors.

Castings may be made in almost any form. Rather intricate designs are practicable. There is no better time than now to investigate the opportunity this offers to you to get rid of corrosion troubles, reduce upkeep cost and better your product.

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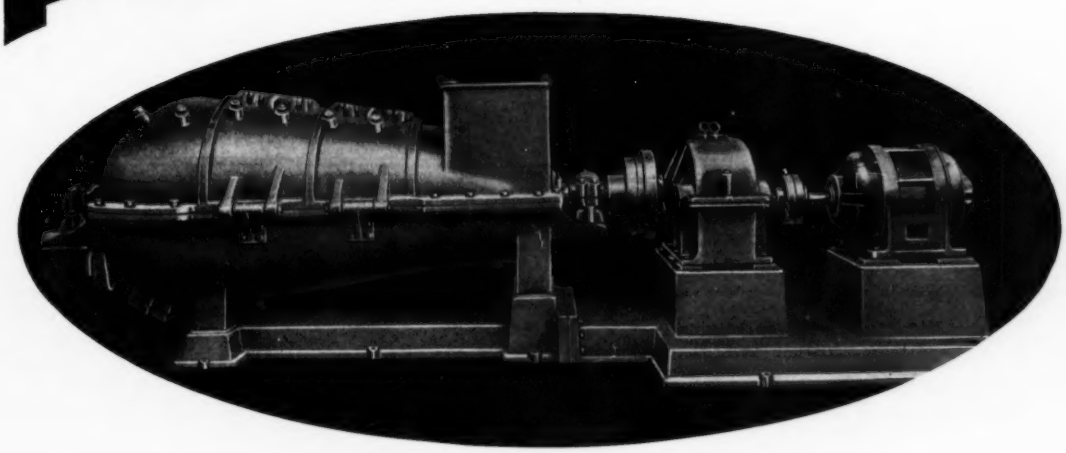
THE JONES PULPER



A New JONES Product

The JONES PULPER has been designed and built to help the paper manufacturer solve the problem of successfully handling rejections and waste which quickly accumulate during manufacturing processes. It also affords a profitable means whereby these waste materials may be re-introduced into the manufacturing process.

Illustrated Bulletin Describing Design and Operation Mailed Upon Request

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of High-Grade Machinery for Paper Mills

The Chillicothe Paper Co.

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Logan E. F. & Eggshell	Adena E. F. & Eggshell
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NINE THE Leahy SCREENS *give* OLYMPIC FOREST PRODUCTS CLEAN, UNIFORM CHIPS

The CLEANLINESS and UNIFORMITY of wood chips coming from the LEAHY NO-BLIND screen result from the sharp, quick vibration transmitted to the ENTIRE SURFACE OF THE SCREEN.

The chips are naturally stratified according to their sizes, and the small bits of wood are screened freely without hindrance by the oversize chips.

We Can Help You Secure Cleaner, More Uniform Chips

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THE Leahy

NO~BLIND VIBRATING SCREEN

Protected fundamentally by Reissue Patent No. 16,701 Reissued August 9, 1927

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Rope - Jute - Sulphate and Sulphite Pulps

Made on both

Fourdrinier & Cylinder Machines

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On SULPHITE BONDS, UNCOATED BOOK, MIMEOGRAPH, CONVERTERS' SPECIALTIES . . . New equipment, improved methods . . . Six Fourdriniers, 175 down to 56-inch trim.

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PAPERMAKERS tell us freely that the steady advance on the chemical side of paper manufacture has been brought about largely by Superior Chemicals. We have always considered it as much our job to develop new and improved chemicals for the paper industry, as to produce standard chemicals of the highest quality.

Our research facilities have recently been strengthened by alliance with one of the country's strongest chemical-research organizations—the Hercules Powder Company. This pooling of interests will benefit our customers in the paper trade.

As always, Superior Chemicals are available in all the paper making centers on short notice and in any quantities. Your order for a sample will receive the same prompt attention as your order for a car of Superior Rosin Size.

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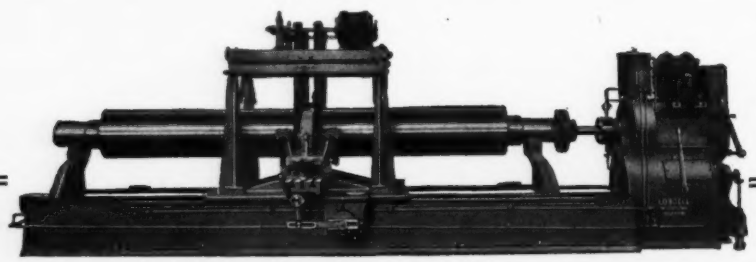
Manufacturers of

PAPER BAGS

SACKS, GUMMED TAPE
NEWSPRINT & KRAFT PAPER

Executive Offices, 475 Fifth Ave., New York
Mills and Bag Factory at Gilman, Vermont



"The *Last Word* in Roll Grinders"

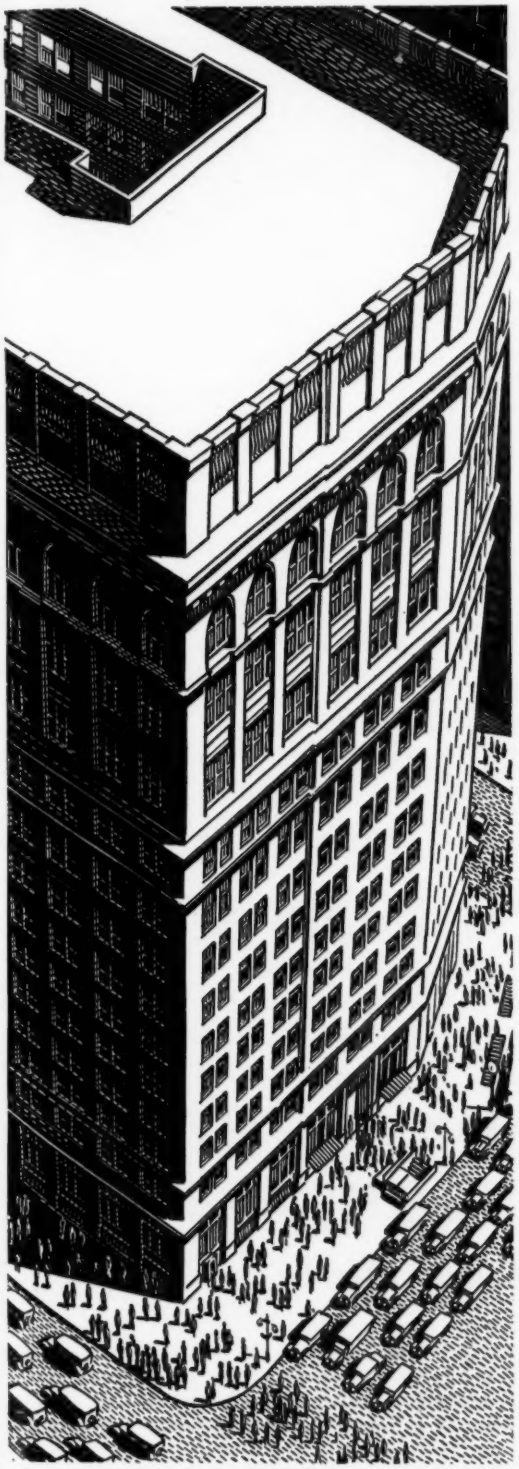
The Lobdell Roll Grinding Machine is the culmination of 50 Years' Experience in the designing and building of Calender Stacks, Rolls and Roll Grinding Machinery. This machine is not only accurate, compact and of pleasing appearance,—but it possesses two features which are "EXCLUSIVELY LOBDELL," viz: THE AUTOMATIC CROWNING DEVICE (the only device which produces the exact pre-determined Roll Crown, by a simple setting of a micrometer scale), —and PROVISION FOR LEVELING THE BED (to compensate for wear).
Other features of this machine are: Direct-connected enclosed geared driving head. Complete automatic lubrication throughout. Absolute protection of "all" moving parts.

"Literature sent upon request"

Other Lobdell Products

Complete Calender Stacks, — "Puraloy" Chilled Iron Calender Rolls,—Improved Roll Caliper

LOBDELL
CAR WHEEL COMPANY
96 Years in Business
WILMINGTON, DELAWARE



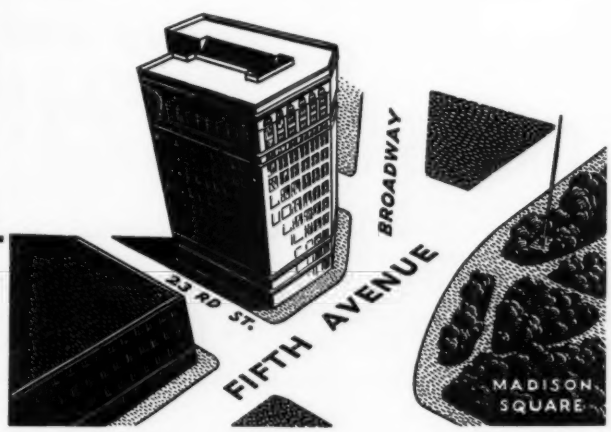
A THOUSAND AND ONE MARKETS UNDER ONE ROOF

200 FIFTH AVENUE, where Fifth Avenue crosses Broadway! Here, in the heart of one of the world's greatest business centers, rises The Fifth Avenue Building—the ideal place to center your New York dealings. Here are the offices of the leaders in many basic industries. Here, under one roof, are a thousand and one ready markets.

Think what that means to the busy buyer! It enables him to complete his seasonal requirements in one easy trip through the building. It saves him the time and trouble and annoyance of having to go from street to street to compare displays and prices of the lines that interest him. Instead of having to cover a wide area, here he can quickly and comfortably complete his business simply by going from room to room!

On our directory are listed the foremost names in numerous lines—paper and paper products, mill equipment and supplies, stationery, office equipment, and many others. An information booth in the lobby supplies facts on any of these lines. Elevator service is unusually efficient. Every thought has been given to the comfort and convenience of both tenant and buyer.

And The Fifth Avenue Building is readily accessible. Busses and surface cars pass the door. A subway enters the building. Grand Central, thirteen minutes away; Pennsylvania Station, ten. Shopping and financial districts at either hand. . . . Won't you let us show you through—particularly if you're planning a new and more strategic location?



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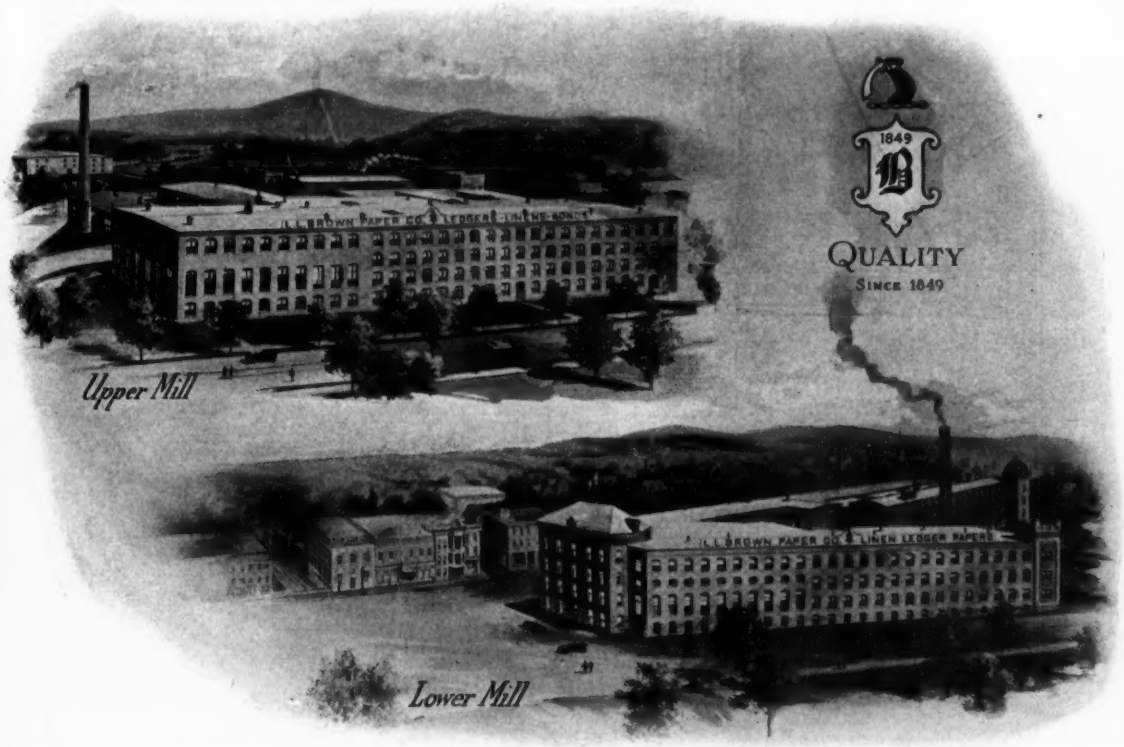

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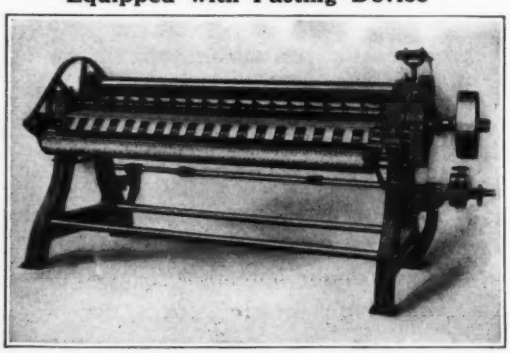

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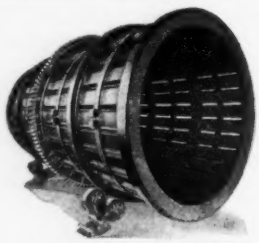

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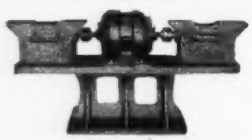

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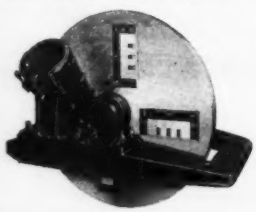

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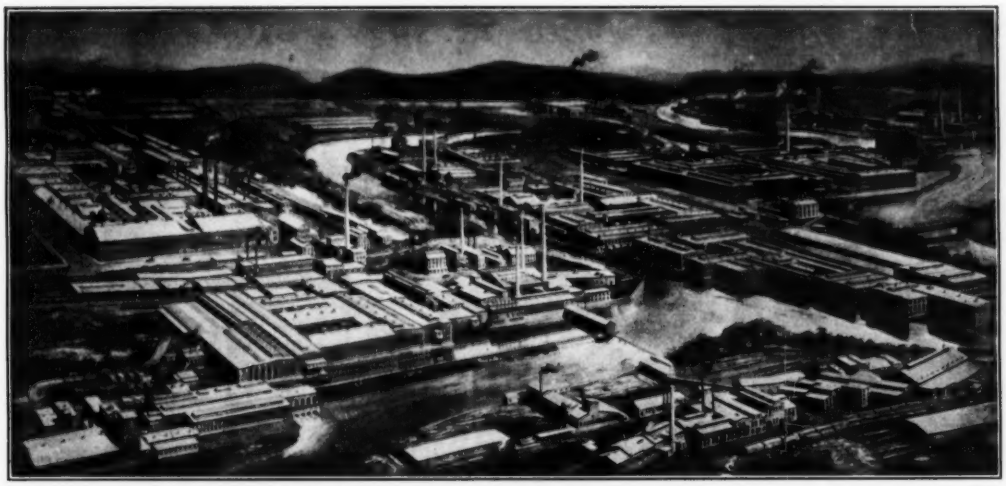

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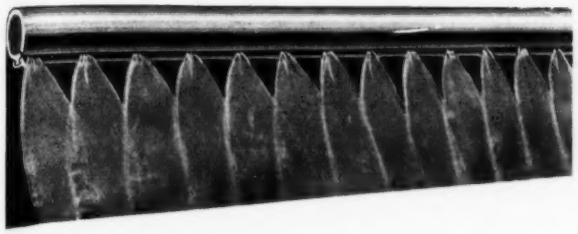

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PAPER TRADE JOURNAL

ESTABLISHED 1872

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

SIXTIETH YEAR

Published Every Thursday by the LOCKWOOD TRADE JOURNAL CO., Inc.

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PAPER TRADE JOURNAL

With Which Is Combined

Vol. XCIV, No. 7 — PAPER — Thursday, February 18, 1932

Fine Paper Industry Has Fairly Stable Year

Despite Orderly Adjustment to Meet Prevailing Conditions, Fine Paper Market Still Shows Semblance of Stability—Physical Equipment of Majority of Mills for Making Paper Never More Efficient, Enabling Them to Manufacture at Lower Costs

By E. H. Naylor, Sec.-Treas. Writing and Cover Paper Mfrs. Assn's

LAST year in reviewing market conditions for 1930, I stated that the fine paper market for that year had the distinction and good fortune to be the one grade of paper which had any semblance of stability. That same statement can still be made for the year 1931, despite the fact that last June the No. 1 sulphite bonds declined in price and in December there was a decline of about 10 per cent in the prices of rag content papers. These declines, however, do not indicate instability, but rather an orderly adjustment to meet market conditions.

Whether or not the change was a constructive move, time alone can tell. In view of the fact that the price of raw materials has shown a decline of 25 per cent from December, 1930 to December, 1931, and even though this represents only 40 per cent of cost, some of the manufacturers felt that it was better to liquidate their papers, although any decline in costs under present conditions had long since been offset by the large increase in overhead due to slack time.

Declined and Fully Liquidated in 1921

These papers also have held a unique position in that they declined and fully liquidated in 1921 and over a period of ten years there were but few price movements. During this ten year period manufacturers have absorbed all advances in raw materials which occurred during the years of prosperity. Most of the mills have also reconditioned themselves so that their physical equipment for making better paper was never finer and this likewise enables them to manufacture at a lower cost. The fine paper industry generally is now up to date in all kinds of manufacturing improvements.

Qualities Markedly Improved

Furthermore, during this same period, the qualities of nearly all of these papers have been markedly improved. So that besides the complete liquidation downward in 1921 as well as the recent change, there was—as it were—a liquidation upward by stepping up the quality of all grades without a corresponding change in price. The consumer today is getting more for his money in fine papers than he ever has before in the history of the industry.

Operations of the mills in 1931 averaged 67 per cent of normal as compared to 83 per cent production in 1930. Shipments averaged 69 per cent so that mill stocks did not accumulate but rather declined 17 per cent. Merchants' stocks are said to have shown a larger decrease.

Profits on Sales Dwindle

The percentage of profits on sales over the last ten years and the earnings on capital invested by the mills have been modest to say the least, but in 1931 they dwindled to nothing and minus in some cases. There is only one turn over of capital in a normal year, and with the risks involved the returns are very limited. In 1931, the capital turnover was only .7.

Cover papers have followed along the same as writing

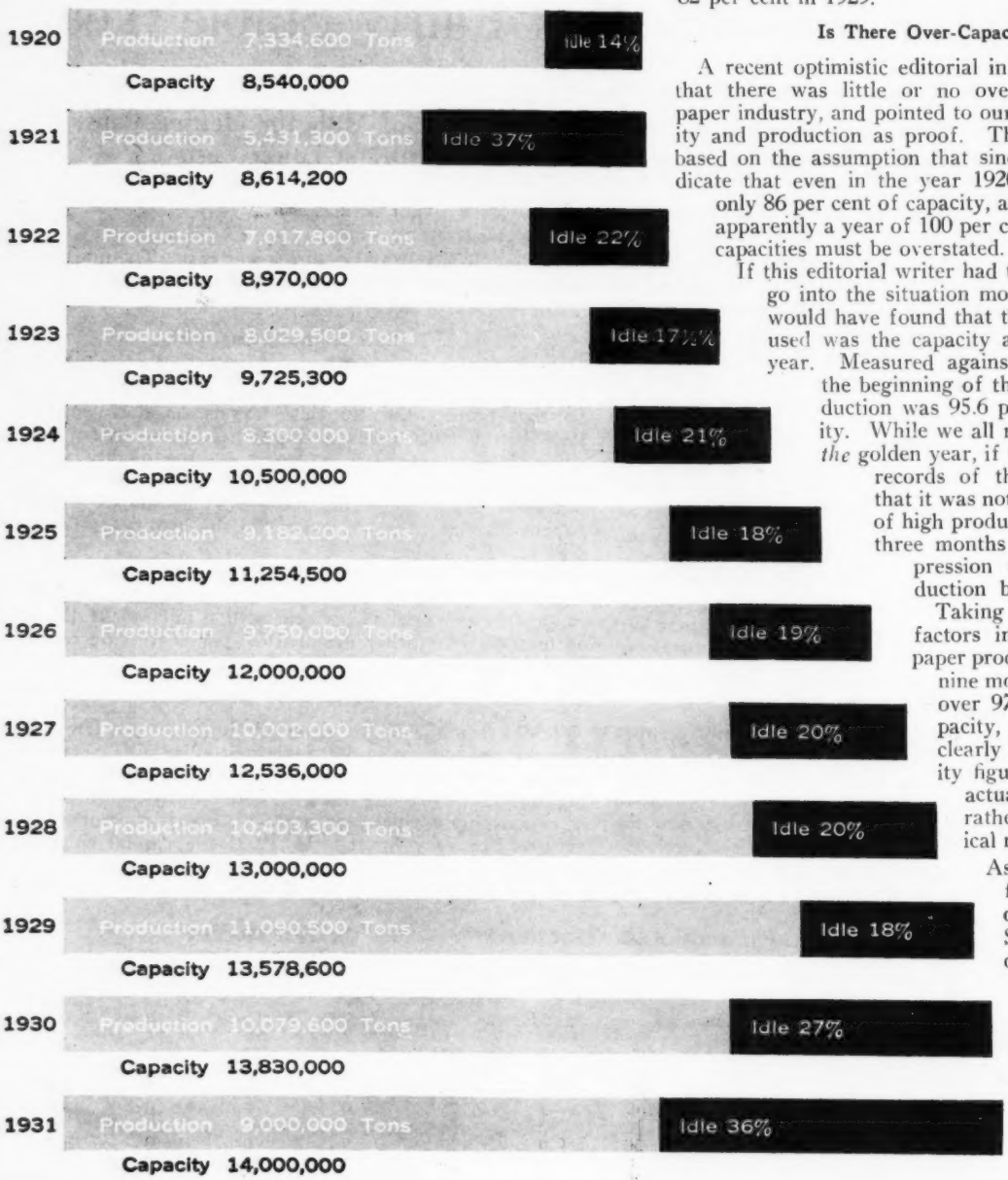
INSTALLATION OF NEW PAPER-MAKING MACHINES IN THE UNITED STATES

	Installed in 1928		Installed in 1929		Installed in 1930		Installed in 1931	
	No. Machines	Capacity 24 Hours	No. Machines	Capacity 24 Hours	No. Machines	Capacity 24 Hours	No. Machines	Capacity 24 Hours
News	0	0	0	0	2	270	1	80
Book	4	185	5	245	3	170	3	155
Board	6	545	3	275	1	35	0	0
Wrapping	8	825	8	630	3	185	2	250
Writing	5	219	1	75	0	0	0	0
Tissue	2	65	10	156	5	112	3	90
Glassine	3	50	0	0	0	0	0	0
Felts and Building	0	0	0	0	1	25	0	0
Specialties	3	38	0	0	1	20	1	20
Total	31	1,927	27	1,381	16	817	10	595

paper, except that there have been few changes in their prices over the last year. It is a highly specialized product and has not necessarily been affected by any change on regular mill lines of bonds and ledgers. Cover paper production in 1931 averaged 57 per cent of normal, but shipments were 64 per cent. Stocks declined 20 per cent.

Each year the Writing Paper Manufacturers Association makes a study of the new machines installed in the paper industry. Reports received from all paper-making machinery manufacturers indicate that ten new machines with a daily capacity of 595 tons were installed in the United States in 1931. This is the smallest number of machines and the smallest capacity added in any of the last twelve years since we have been compiling these figures. One wonders, nevertheless, what prompted the introduction of this new capacity in a year of such general economic distress and over-capacity in every branch of the industry. For many years we have pointed out the tendency to over-expand the paper industry. It is now more strikingly evident than ever that capacity is beyond consumption even under normal conditions. Not only is the industry burdened with over-capacity in different grades, but the shifting of manufacturers from one grade to another has intensified competitive conditions with gains to no one.

Capacity at the end of 1930 was estimated at 13,830,000 tons. 1931 additions bring the capacity of the industry to 14,000,000 tons. The estimated production of 9,000,000 tons for 1931 indicates operations at 64 per cent of capacity, as compared with 73 per cent of capacity in 1930, and 82 per cent in 1929.



CAPACITY AND ACTUAL PRODUCTION OF PAPER MACHINES IN THE U. S. A.

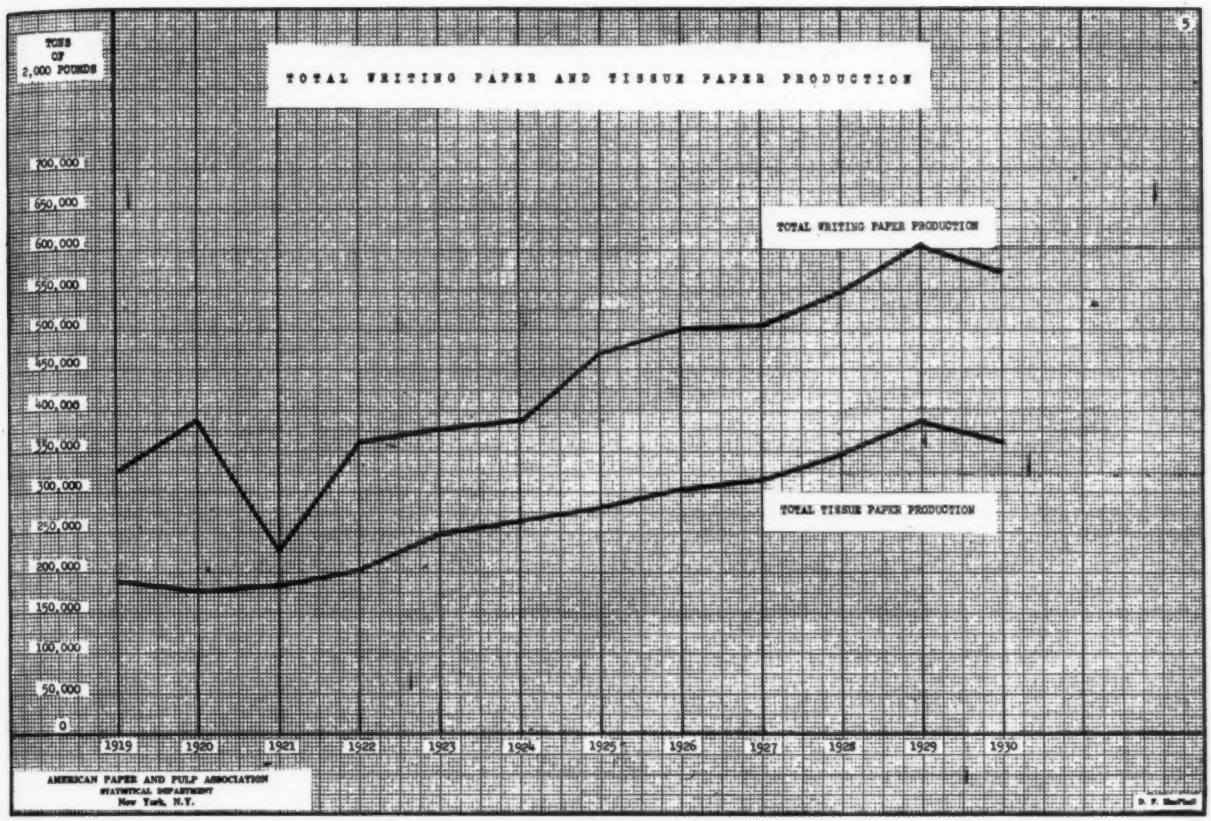
Is There Over-Capacity?

A recent optimistic editorial in the trade argued that there was little or no over-capacity in the paper industry, and pointed to our figures of capacity and production as proof. This argument was based on the assumption that since our figures indicate that even in the year 1920 production was only 86 per cent of capacity, and since 1920 was apparently a year of 100 per cent operation, our capacities must be overstated.

If this editorial writer had taken the pains to go into the situation more thoroughly, he would have found that the capacity figure used was the capacity at the end of the year. Measured against the capacity at the beginning of the year, 1920 production was 95.6 per cent of capacity. While we all remember 1920 as *the* golden year, if we go back to the records of that year we find that it was not uniformly a year of high production. In the last three months of 1920 the depression started and production began to fall off.

Taking the above two factors into consideration, paper production in the first nine months of 1920 was over 97 per cent of capacity, indicating very clearly that these capacity figures are based on actual potentialities rather than theoretical maxims.

As a matter of fact, the capacity of the United States paper industry is probably larger than indicated in these charts, since in the figures of recent years it has been the practice to eliminate the capacity of *idle* mills.



A recent survey indicated that there are in the United States 89 idle mills with a capacity of over 3,000 tons per day, or nearly 1,000,000 tons per year. This refers only to mills which are not operating at all.

No new machines were installed for cover or writing paper. Considerable capacity, however, has been shifted from other grades to the very lowest grades of sulphite bond.

Three additional machines with a daily capacity of 155 tons were installed for book paper; two kraft machines with a daily capacity of 250 tons were installed, and also three tissue machines making 90 tons a day.

For 1932, four machines are now on order, having a daily capacity of 182 tons. One of these is a very large book machine having a capacity of 150 tons per day. Another machine, making 20 tons a day is for art papers, such as colored text and drawing papers. The other two are small machines making specialties.

To Build Paper Laboratory

A contract has been let for the construction of a $50,000 pulp and paper laboratory building at the New York State College of Forestry, Syracuse, N. Y. This building will house the semi-commercial pulp and paper laboratories of the college now in the basement of the present College of Forestry building, according to Professor C. E. Libby in charge of the pulp and paper courses at the College of Forestry.

The new building will be 160 feet long by 60 feet wide, a one story and basement structure containing approximately 18,000 square feet of floor space. The building is designed to contain a general chemical analytical laboratory, a paper dye-stuff laboratory and a paper testing laboratory equipped with constant humidity and temperature control. There will also be a pulp testing laboratory, research laboratories and a semi-commercial digester room and a paper machine room.

The semi-commercial digester room will contain digesters for manufacturing pulp by the various chemical processes and the digesters will be of a size to produce from 200 to 300 pounds of chemical pulp from a single cook. It is proposed to install a sulphite digester and an alkaline pulping digester which will be used both for the soda and sulphate processes of making pulp. This digester room will also be fitted with equipment for the manufacture of acid, caustic cooking liquors and bleach liquors. It is planned to install several pieces of semi-commercial wood-preparing equipment like barkers, chippers and chip screens. A mechanical pulp grinder will also be installed.

The paper machine room will contain pulp beaters, Jordan engines and a 30 inch combination Fourdrinier and cylinder paper machine. The cylinder part of the machine has been designed with three cylinders to enable the college to experiment with the manufacture of paper boards which are of particular interest to New York State because of the large number of paper board mills in the State.

Finnish Pulp Exports for 1931

Finnish chemical pulp exports during 1931 totaled 629,000 metric tons, according to Commercial Attache Summer, at Helsingfors. Stocks on hand at the end of the year were reported as lower than at the end of 1930, while over one half of the 1932 and 1933 output has already been sold. The mechanical pulp association report their shipments last year at 42,000 dry tons.

Book Paper Industry Affected By Depression

Specially Written for the Annual Review Number of the Paper Trade Journal

IN reviewing the book paper industry for 1931, it can only be said that this industry has suffered in general with all lines during the past year. The depression, although considered quite severe in the early part of 1931, apparently became worse throughout the year, having perhaps reached the climax in December when the book paper mills did not operate more than about 55 to 60 per cent. Statistics show that the operation during January, 1931, was about 70 per cent. This decreased slightly at various times during the year, perhaps again reaching as much as 75 per cent in the early summer. From then on, there was apparently a steady decline in the volume of business until the 60 per cent point was reached in December.

This decrease in the consumption of book paper was in all lines, but perhaps to a greater extent in the publication of magazines and periodicals which have suffered severely from decreased advertising which has shown in the prominent magazines, a decrease of anywhere from 35 to 50 per cent. Magazine circulations have not suffered to any great extent, but on account of the decreased advertising, publishers have been forced to reduce the pages for reading matter, which, together with the loss of advertsiing, meant a very large decrease in the consumption of paper.

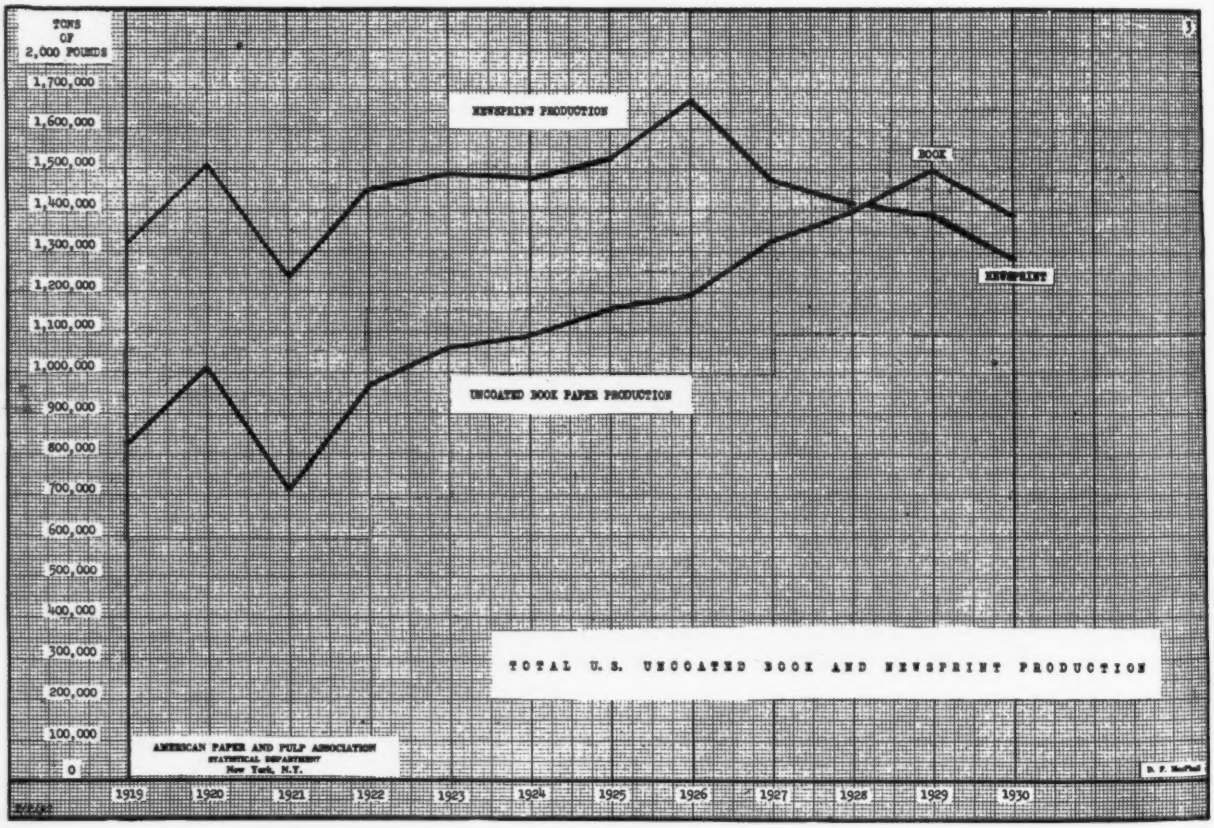
On account of the decrease in the consumption of book papers, naturally the current prices were affected very severely—mills apparently making any price to secure business that might enable them to increase their percentage of operation. Therefore, during the year there has been nothing but decline in prices, which, by the end of the year, has amounted to approximately 10 to 15 per cent. The decline in prices, together with limited operations, has been a severe blow to the manufacturers generally and has reflected materially in their earnings. As a matter of fact, very few, if any of the book mills have been able to show any profit whatever—most of them having been run at an actual loss.

Outlook for Coming Year

There have been three new machines installed during 1931 with a capacity of 155 tons and as far as can be ascertained there is not more than one new machine that will come on the market during 1932. The outlook, therefore, for 1932 will depend entirely upon the recovery of business generally, especially advertising in magazines and periodicals.

Unfortunately it has been the policy of the paper manufacturers to keep expanding to such an extent that productive capacity of the mills is apparently always ahead of the consumption of paper and for this reason, prices are constantly declining.

Improvement in business generally that might increase the consumption of book paper to approximately 100 per cent production will mean firmer prices, but until such a thing happens, we fear the outlook for better prices is not good; therefore, a fair margin of profit for the manufacturers cannot be looked for as long as present conditions exist.



News Print Consumption Declines During 1931

By C. L. Sibley, Regular Correspondent of the Paper Trade Journal

AS the pulp and paper industry of Canada is essentially an export industry, conditions which have faced the producers in the year just closed may aptly be summed up by the statement that in the twelve months ending December 31 last, the value of the exports of pulp and paper showed a falling off of $44,219,290, as compared with those of the year 1930, and of $65,006,174 as compared with the year 1929.

The principal decrease was in news print which was less by $26,037,820 than in 1930. Total exports of pulp and paper were valued at $141,170,685, as compared with $177,500,222 in 1930. Details of the exports for 1931 as compared with those for 1930 are as follows:

	1931	1930
PAPER		
News print	$107,243,112	$133,280,932
Book paper	208,036	365,801
Bonds and writing	16,189	20,148
Wrapping Kraft	907,604	1,381,462
PULP		
Mechanical pulp	3,606,167	5,967,172
Sulphite pulp	3,617,424	5,151,652
Sulphite (bleached)	16,292,735	17,954,714
Sulphite (unbleached)	5,146,954	9,201,250
Wood Pulp screenings	224,434	415,606
All Others	178,909	369,585
Total	$141,170,685	$177,500,222

Dead Weight of Idle Machinery

There is little comfort in the fact that, comparatively speaking, exports of pulp and paper during the past two years have stood up well in comparison with those of other industries, because it so happens that the commencement of the falling off in demand came at a time when an extraordinary expansion in producing capacity was reaching its culmination. Thus during the past year practically half the equipment for the production of pulp and paper in Canada has been lying idle, and although most of the machinery is now obsolete or rapidly approaching that condition, this idle potential capacity hands like a dead weight around the neck of the industry. Fortunately, from the beginning of the year to date Canadian news print machine capacity has remained fixed at 12,376 tons daily. Considering that this figure is the highest ever reached in the industry, representing an increase of nearly 200 per cent over that in force a few years back the marvel is that the industry has done as well as it has in the general conditions that have prevailed.

In January, 1925, the capacity of the Canadian news print mills was 5,152 tons daily. This represented a monthly production, if working to capacity, of some 133,952 tons. Actual output that month was 121,420 tons, or about 90 per cent of capacity. Two years later, in January, 1927, capacity was up 7,276 tons daily, or 189,176 tons for the month, as against actual output of 161,724 tons, a ratio of just under 89 per cent. By January, 1929, daily capacity was up to 10,018 tons, or around 260,000 tons for a month; against this was output of 212,191 tons, or just under 82 per cent. By January, 1931, output was increased to 12,376 tons daily, or about 309,000 tons monthly as against actual output of 182,657 tons. Thus in six years the installed capacity of Canadian news print mills rose over 140 per cent (from 5,152 to 12,376 tons daily); output as between the two dates had increased only some 50 per cent. Hence the low operating ratio in the industry today.

A feature of the year has been the open recognition of the failure of the plan of the News Print Institute of Canada to pool orders and control prices. Competition has been free, but at the same time fairly constant price levels have been maintained. Two price reductions have been announced during the year. In April a cut of $3 per ton was announced, retroactive from the beginning of the year to May and of $5 per ton from May 1 onward. In December a further cut of $4 was announced, making the 1932 price for delivery in New York $53 per ton.

Merger Plans the Leading Feature

The most important developments of the year have centered around the efforts of news print executives to rid themselves of the incubus of the over-capitalization incurred during the boom years and to cut their costs so as to permit of more economical production. The outstanding example in this connection occurred in connection with the Canada Power and Paper Corporation. After some months of study by a Securities Protective Committee a plan was evolved and put into execution by which a new company called the Consolidated Paper Corporation took over the concern, the securities of the constituent subsidiaries being exchanged for stock of the new company. This resulted in a reduction of the capitalization from $103,832,266 to $52,627,596. It was expalined that this would mean a reduction of fixed charges by about 50 per cent and a part of the plan was entire relief—if necessary—from bond interest over the next five years and elimination of preferred stock.

The Anglo-Canadian Pulp and Paper Corporation, which had previously been taken over by Canada Power and Paper, was not included in the new line-up, but reverted to its previous ownership. There was some opposition to the plan, especially on the part of the Belgo-Canadian Paper Company, shareholders of which sought restraint through the Courts. The plan, however, was upheld and was consummated in its entirety before the end of the year, some of the most influential men in the industrial and financial life of the Dominion being elected to the directorate of the new company.

Huge Merger Under Negotiation

Immediately following the reorganization of this powerful group of producers, negotiations were opened up for a giant merger of Canadian news print companies which would bring into one organization companies having a total annual capacity of 200,000 tons of news print, or about half the annual consumption of the American continent. A special body of leading business men are working on this merger, under the chairmanship of E. W. Beatty, K. C., president of the Canadian Pacific Railway. Associated with Mr. Beatty are Sir Charles Gordon, president of the Bank of Montreal; M. W. Wilson, general manager of the Royal Bank of Canada; Alexander Smith, president of Abitibi Power and Paper Mills; A. R. Graustein, head of Canadian International Paper; Ernest Rossiter, president of St. Lawrence Corporation; Colonel Price, president of Price Bros. & Co., and the Hon. Charles Dunning, president of Consolidated Paper Corporation. The mills proposed to be brought into the consolidation are those of Canadian International Paper, Abitibi Power and Paper, Consolidated Paper Corporation, St. Lawrence Paper Corporation, Price Bros. & Co., and Minnesota and Ontario Paper Company.

The negotiations are proceeding favorably, and have arrived at the point where the various companies are tabulating statements. It will be months, however, before a definite basis can be arrived at. It is semi-officially announced that "principal efforts of the news print makers would be directed towards the most economical operation of the combined properties. The necessity of competing with each other has resulted in wasteful operations and surplus productive capacity. A merger will permit self-regulation of an industry heretofore divided by private wars." According to Sir Herbert Holt, the president of the Royal Bank of Canada, and one of the leading figures in the news print industry, those who are working on the plan aim at nothing less than the integration of the entire news print industry in Canada east of the Rocky Mountains.

In view of the great importance of this plan both to the news print industry and to American publishing interests, the following official statement on the subject, issued by the International Paper Company through J. L. Fearing, vice-president of sales, is important. The statement appears to indicate that it would be necessary, if the merger goes through, to incorporate not only the International's Canadian mills but also the Company's Newfoundland properties. The statement follows:

International Paper Company's Statement

"The newspapers of New York and of other cities have recently printed lengthy articles concerning the Canadian news print situation.

"It has been stated that conferences are being held and that there exists a sentiment in favor of the consolidation of the large Canadian news print units.

In 1910, three years before news print was placed on our free list, Canada sold about 25,000 tons of news print in the United States. The phenomenal growth of the news print industry in Canada since that time is shown by the following figures:

Purchased from United States mills		Imported from Canada and Newfoundland
1,200,000 tons	1910	25,000 tons
1,463,000 tons	1920	680,000 tons
1,507,000 tons	1925	1,310,000 tons
1,373,000 tons	1929	2,325,000 tons
1,272,000 tons	1930	2,145,000 tons

"Canada's news print industry, with its many ramifications, extends far back into her forests—a hundred miles or more from civilization. To many thousands of her people in various walks of life it is the sole source of livelihood. It is today the largest manufacturing industry of the Dominion.

"A single mill may control several thousand square miles of forest, vast and remote territories where the labor of hand is hard, and the hazard to capital is high. During the fall freeze-up or the spring break-up these regions may be completely isolated—they are dependent on the meager resources of the lumber camp for the necessities of life itself.

Operations Are Extensive

"In winter, trees are felled, cut into logs and hauled over snow roads to the river-bank to await the drive. When spring unlocks these frozen rivers the logs start their long journey to the mill—a journey that may take several months, possibly two summers and even more. To pick up the stranded logs and break up the jams that form, crews of river drivers follow the logs in big bateaux, often working fourteen hours a day in the icy waters. Hardy men they are—experts with the pike pole and the peavey.

"Thus from the depths of the wilderness to the quiet waters of the mill pond comes the annual harvest of the forest to be fabricated into your white paper.

"While woods work is a heavy burden, the risk to capital involved is no less so. Forests burn or blow down, or may be swept by insect pests. A network of observation towers and telephones with airplane patrol helps to prevent fires, but even these safeguards are not always successful. Sometimes conflagrations are only extinguished after months of effort by an army of men over miles of battle front.

Demand Grows Fast

"Following the great war the consumption of news print in the United States increased very rapidly. The promotion and building of mills in Canada more than kept pace with it. With unrivalled water power and forest resources there was every reason for Canadians to believe they would continue to increase their news print business in the United States year after year. Some warnings that the boom might be nearing its end were issued from time to time in 1927, 1928 and 1929, but they were entirely unheeded.

Huge Unsold Capacity

"News print manufacturers, not only in Canada, but in other countries, now find themselves with a huge unsold capacity. Many units are bankrupt and others not far from it. Other difficult problems are crying for solution. In Canada it is vital to the nation itself that these problems be solved quickly and permanently.

"How can this be accomplished? What is the best and safest way out?

"Recent conferences have been attended not only by the officials of our subsidiary, Canadian International Paper Company, but by the officials of other outstanding Canadian paper companies, and by representatives of important Canadian banking interests. E. W. Beatty, president of the Canadian Pacific Railway and one of the most public spirited leaders of Canadian opinion, has also been present.

Facts to Face

"In these conferences it has been suggested that a consolidation of the more important units would probably provide the best remedy. It has also been argued that no scheme for consolidation will be worthwhile unless the set-up is based on a very conservative capitalization combined with the operation of the most efficient type of low cost mills. Knowing that the industry today is suffering from the effect of low prices, greatly aggravated by low operating ratios, and that, with only a few exceptions, fixed charges are not being earned, it is realized that no consolidation would be of any value unless it could show very substantial savings. Such savings, it is felt, would be assured by running the most efficient units to capacity, while maintaining the fairly modern ones on a lower scale, and eliminating those with excessively high costs. Furthermore, it is believed that other savings not now possible could be developed—such as, for example, the elimination of excessive freight costs now caused by an illogical geographical distribution of tonnage; the avoiding of unnecessarily heavy inventories due to the present tendency to over-estimate future requirements; the co-ordination of selling the manufacturing under the most expert leadership available; together with the elimination of many other losses and leaks that now exist but which could be prevented.

Advantage of Merger

"Not only would a consolidated company be able to

produce and distribute news print paper more economically, but it would also be far better equipped to alleviate the distress and actual suffering which present day conditions bring upon the workmen at mills which are forced suddenly to shut down without an opportunity adequately to cope with the social problems that a shutdown entails.

"International Paper Company's subsidiaries in Canada and Newfoundland comprise a group of the largest and most efficient mills in the world. Under normal business conditions these mills, if operated at full production, could show fairly satisfactory earnings even at low prices that now prevail.

Want Lower Price

"Tremendous pressure has been put upon the news print mills of North America, as you well know, to reduce prices because of the slump in advertising which has been affecting your business and which has made such reductions necessary from your stondpoint.

"In all fairness you will agree that when price reductions are accompanied by world-wide depression and unusual idle mill capacity, together with an imminent increase in freight rates, they must inevitably involve serious financial risks to many important manufacturers of white paper. The lower the price, the greater the necessity for measures of relief.

Have Own Policy

"No publisher should, however, be misled by sensational statements and propaganda, to believe that the present high purchasing power of the United States dollar actually means a corresponding reduction in costs at our Canadian mills. Savings are, of course, currently available through the payments of wages and the purchase of materials in Canada with the cheaper Canadian dollar; but interest continues to be payable in United States funds. Last, but most important of all, the supply of pulpwood which will be used for at least another year, was bought and paid for at a time when the United States dollar had no advantage.

"Thus far, the conferences in Canada have definitely indicated a very serious determination to reorganize the industry so that it can be operated profitably at low and stable prices.

"Unless these fundamentals are used as a cornerstone, and unless the other policies in which International believes and to which it has adhered in recent years are written into the code of the proposed consolidation, we shall continue to paddle our own canoe."

Remarkable Year in Power Development

The development of hydro-electric power is closely bound up with the news print industry; indeed, some of the largest power concerns in the Dominion are owned directly or through subsidiaries by news print concerns. It is interesting to note, therefore, that 1931 was another remarkable year in power development. During the year new installations completed and placed in operation totalled 546,650 h.p., which brought the total water-power installation in the Dominion to a figure of 6,666,000 h.p. after allowing for several replacements of old by new turbines.

Additional to this substantial total of completed undertakings, construction was advanced upon a number of projects, some of which are of great magnitude. It is expected that these will be brought into operation within the next two or three years and will add more than 1,400,000 h.p. to the Dominion's water-power development.

Capital to the extent of at least $110,000,000, it is estimated, has been expended in providing for the development, transmission and distribution of the new power developed in 1931, while more than $280,000,000 will be required to bring to completion the projects actively under construction.

During the past year, Quebec took the lead in new installations totalling 382,200 h.p., while in the other provinces figures were: British Columbia, 25,200 h.p.; Manitoba, 79,000 h.p.; Ontario, 58,200 h.p., and Nova Scotia, 1,650 h.p.

Some of the developments in which news print concerns are interested may be mentioned. In British Columbia the Powell River Company brought a new plant into operation on the Lois River with an initial installation of 24,800 h.p., the power being transmitted to the company's pulp and paper mills at Powell River.

In Northern Ontario the Ontario Power Service Corporation, a subsidiary of the Abitibi Power and Paper Company, made good progress in the construction of a 330,000 h.p. development at the canyon on the Abitibi River. This is expected to be ready for operation in the autumn of 1932. Part of the power will be supplied to the Hydro-Electric Power Commission of Ontario for transmission to the Sudbury mining district, while the remainder will go to the mills of the Abitibi Power and Paper Company of Iroquois Falls.

Gatineau Power Company, a subsidiary of the International Paper Company, installed the seventh 34,000 h.p. unit in its Paugan plant on the Gatineau River, in Quebec, bringing the total in this plant to 238,000 h.p. The MacLaren-Quebec Power Company commenced the construction of a 130,000 h.p. development at Masson Falls on Lievre River which is planned to come into operation in 1933. The James MacLaren Company, which is the parent company, has a ground wood mill at Buckingham and a news print and sulphite mill at Masson.

Plant Investments During Year

Although in a general way there has been little new construction during the year, some important individual projects have been carried out with a view of improving facilities and lowering cost of production.

The E. B. Eddy Company, Ltd., of Hull, Quebec, has shown its faith in the future by installing a $500,000 filtration plant during the past year. The company further announces that if conditions improve it will proceed with extensions, spending as much money in 1932 as in 1931. The whole program of reconstruction, it is stated, might run over a period of years to as high as $12,000,000. The complete plan of rehabilitation involves the concentration of the company's activities around the lower mill site, and embraces the installation of new paper machines, and the rebuilding of the sulphite pulp mill, bleaching plant and ground wood pulp mill. Other improvements laid down in the scheme include the concentration and enlargement of boiler capacity, the rearrangement of storage and handling facilities, additional pulp preparation equipment and the erection of a new office building.

The Powell River Company, the largest producer of news print on the Pacific Coast in Canada, completed during the year its program of improvement and expansion. Several million dollars were involved in the scheme, which has already resulted in increasing the news print capacity of the plant to 650 tons daily, as well as providing an additional 22,000 h.p. of electrical energy. In four expansion periods, spread over 20 years, the Powell River Company has invested over $30,000,000 in the news print mill at Powell River, B. C. Today the plans of the company call for an ultimate expenditure of $13,000,000, of which approximately $8,000,000 has been spent on the present extension at Powell River and on the hydro-electric development at Lois River.

During the current year a new machine room, to ac-

commodate two additional machines, operating its speed up to 1,400 feet a minute, was erected. The seventh machine was installed and brought into operation, while an eighth machine will be set in place when market conditions warrant it. A new grinder room, with sixteen grinding machines, and additions to the existing steam plant, a new sixteen ton digester and several other minor installations, were included in the construction program.

The Westminster Paper Company, of New Westminster, B. C., during the year installed a new two-color high-speed printing press, to be used in connection with the printing of fruit wrappers. The machine has a capacity of approximately 20,000 sheets an hour. Twenty wrappers are cut from each sheet, making the capacity of the press between 400,000 and 500,000 wrappers per hour.

Ontario Paper Company, controlled by the *Chicago Tribune* interests, continued with its development program in Quebec, where it has under way the construction of a large power plant, which will supply energy to a proposed pulp mill at English Bay on the Manicouagan Peninsula. At present work is well advanced on the initial development of 40,000 h.p. on the Outardes River.

Bathurst Power and Paper Company of Bathurst, N. B., completed during the past summer a new kraft liner and board unit, which was brought into operation early in August.

Paper Stock Market Disappointing In 1931

By Walter R. Hicks, of Daniel M. Hicks, Inc.

EVERYBODY has felt the depression. Everybody except the saxophone player and the crooner. They are not even discouraged. The saxophone player's motto is "Blow your own horn"; the crooner's slogan is "Keep a humming"; and this may be the answer. Depression has been the cry in 1931. In many cases business has accepted it, rather than digging in to overcome it. People are waiting for business to come back—rather than striving to bring it back. Folks must eat, be fed and clothed and housed, and go places and do things. But, people wait for business and business waits for the people, and the process is slow and tedious.

The intricacies of world affairs have brought about paralysis in international trade. Tariffs, moratoriums, war debts, and countries going off the Gold Standard have brought a hold-up in business. In fact "hold-ups" have become a most flourishing business in our own glorious country. It is a hazardous game. There is no credit risk. They draw on you at sight, and payments are made on demand. This government believes in protection—and the racketeers are getting all the protection. The theory today is—Spend, and the world spends with you; save, and the bank closes its doors. Life may be a stage, and the people the actors; but business life is a pantomime, with the people going through the motions of business. If independence means you do not take orders from anybody, the Americans are an independent people. We turn to adages for comfort, and find the market so swamped that they conflict, for on one side we have "Everything comes to him who waits," and on the other, "He is lost who hesitates." Still, the world is a good old place to live in, particularly when there is no other place to live. Yet, order will come out of chaos, and where science fails, nature will take its course.

And somewhere in the scheme of things there are Rags and Waste Paper. Railroads still classify them as a commodity, but they do not appear to be a commodity on any other basis. There may be a new use for rags—as people are wearing them, but waste paper still remains just Waste Paper.

Paper Stock Situation

Speaking of Paper Stock, let us direct our attention to it. At the present time the market on all grades of both Waste Paper and Rags is as low or lower than pre-war levels. It would appear that the adjustment has worked itself out, and even though there be little demand at present, the consumer can buy with safety. There will not be any boom, but there will be the normal advances and reactions within limits that will not hurt either buyer or seller, and it should result in a steady movement of stock, which after all is all that can be expected of any market.

Waste Paper: The tax collector and the rent collector may go away empty handed, but the waste paper collector never does. Supplies exceed demand until through necessity because of lack of money or room he is compelled to sell at any old price. A few grades will serve to illustrate as compared with the normal levels of pre-war prices, and the market at the close of 1931.

WASTE PAPER
(F.o.b. New York)

	Pre-War	End of 1931
Mixed papers	.30 @ .35	.15 @ .20
News	.45 @ .50	.25 @ .30
Magazines	.75 @ .85	.65 @ .70
Soft White Shavings	1.60 @ 1.65	1.55 @ 1.60
Hard White Envelope Cuttings	2.00 @ 2.25	1.90 @ 2.00

Rags: Low priced cotton, curtailed production on the part of cotton mills, and practically no demand for breaking up, had its effect on New Cuttings as paper making was about the only outlet. In the same order, as given on Waste Paper values, the market was about as follows:

NEW RAGS
(F.o.b. New York)

	Pre-War	End of 1931
White Shirt Cuttings	5.00 @ 5.50	4.50 @ 4.75
Fancy Shirts	3.25 @ 3.50	1.75 @ 2.00
Washables	2.25 @ 2.50	1.50 @ 1.60
OLD RAGS		
No. 1 Old Whites	3.50 @ 4.00	3.75 @ 4.00
No. 2 Old Whites	1.75 @ 2.00	1.75 @ 2.00
Thirds and Blues	1.50 @ 1.75	1.50 @ 1.75
Roofing	.60 @ .70	.40 @ .50

Now is the time for all good men to come to the aid of their country. The market is not suffering from overproduction, but from disorganized production. The banks, the barns, and the warehouses are full. So, cheer up. And, although economists are stymied, there is the faith, the hope, and the spirit of Old America that will conquer depression and start the country on the way to prosperity.

Newfoundland's News Print Business

From St. John's, Newfoundland, it is reported that according to the annual report of the Newfoundland Board of Trade the news print industry, operating at capacity during 1931, provided the one bright spot in Newfoundland's business during the year. News print exports from the mills at Cornerbrook and Grand Falls totalled 267,420 tons, valued at $17,134,807.

Paper Board Output Well Maintained In 1931

By Grafton Whiting, Statistician, Paperboard Industries Association

PAPER ranks seventh among the major industries in the United States. Of its various branches paper board is largest in volume and value, and it is not surprising to find that during 1931 the paper board mills and the fabricated products suffered in the results of their operation, as did other industries.

Contrary to the general trend, however, the volume of output held close to that of 1930, as evidenced by the following figures:

VOLUME INDEX

Large Industries	Index 1929	Index 1930	Loss % 1929-1930	Index 1931 (9 Mo.)	Loss % 1929-1931
Pig Iron	121.2	90.8	—25	58.2	—52
Auto Prod.	189.5	121.1	—36.1	94.2	—50.3
Steel Ingot	133.5	97.1	—27.2	67.8	—49.2
Copper	136.5	98.3	—27.9	71.6	—47.6
Cement	159.	150.1	— 5.6	124.8	—21.4
Paper (a)	145.3	128.4	—11.7	123.5	—15.1
Boots & Shoes	112.5	94.5	—16.	104.2	— 7.4
Composite	142.8	111.5	—22	92.0	—35.6
Boxboard	128.4	120.5	— 6.2	119.3(b)	— 7.1

(a) Paper in general including news print and fine papers.
(b) Based on identical companies—P.I.A. Mill Statistics.

The failure to operate profitably during the year in face of the sustained volume was due to the severe decline in prices which outran every endeavor to reduce costs to meet the situation.

The paper board industry is divided into four major groups, namely: Box board mills—producing box board and similar types of heavy fiber board, Container plants—manufacturing shipping cases and packing materials—Folding box makers—supplying collapsible cartons and display packages—Set-up box plants—fabricating rigid paper board boxes. The first three of these groups are represented by the Paperboard Industries Association, and the following review treats chiefly of their experience during 1931.

Box Board Mills

For a period of ten years or more the box board mills had been accustomed to experience a yearly growth averaging over 5 per cent and this naturally led to plant expansion and the addition of new machines. In 1930 the situation changed and a loss of volume caught the industry with a capacity far in excess of demand. Again in 1931 the total tonnage output was less and more machines were forced into idleness.

The capacity and growth is shown in the following table:

MILL CAPACITY[1]

Tons Per Day

	1926	1927	1928	1929	1930	1931
Rated Tons	13,017	13,764	14,826	15,682	16,439	17,204
Tons Added	.....	747	1,062	856	757	765
% Gain	.....	5.7	7.7	5.8	4.8	4.7

[1] The daily rated tonnage for all mills known to produce boxboard was taken from Lockwood's Directory (Lockwood Trade Journal of New York City) for each year 1926-1931.

An increase in capacity is occasioned by the installation of new equipment or by greater productivity in the existing plants. During the last two years some additions have been made but the urge to reduce costs by greater plant efficiency has been strong. The following table states the tons per hour for a typical machine of 100 inch trim, and the extent of the increase in capacity attributable to greater average output.

AVERAGE TONS PER MACHINE HOUR

	1926	1927	1928	1929	1930	1931
Tons per Hour	2.643	2.739	2.964	2.984	3.019	3.100

The gain in 1929 over 1928 was 40 lbs. per hour; in 1929-1930, 70 lbs., and in 1930-1931, 182 lbs.; all of which is the equivalent to increased capacity. Furthermore, the average weight per M. sq. ft. of the board produced has decreased and since fabricators compute their finished product on an area basis the ability of the mills to supply their wants is greater by the extent to which the board is lightened.

Mill Activity

The operation of a paper machine requires a certain complement of orders ahead in advance of running.

This is because preparatory work is required in starting up the machinery and adjusting the process of maintaining the flow from the pulping operation to the finished board. The cost in labor and expense of this preparation must be borne by the tonnage subsequently produced. It is common practice therefore to accumulate sufficient orders to make a

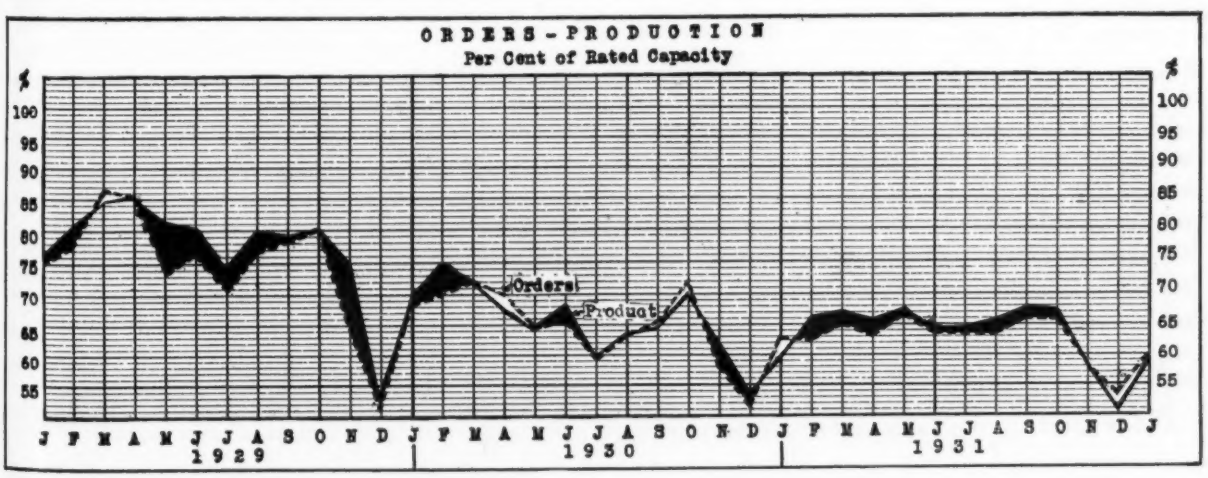


CHART 1.

The actual order and production are each divided by the rated capacity to procure an expression in percentage. The two series of monthly figures are drawn on the same chart and where orders exceed production the intervening space is left white. The reverse position is indicated by the black areas.

run economical and to continue to operate until these are completed.

During 1931 the volume of orders enabled the average machine to be run only 3.7 days per week, or at an activity of 64 per cent based upon capacity registered for that period.

The rate of activity must be given careful consideration since it has such a direct bearing on the costs, and the basis upon which future orders may be priced if profit is to result.

The accompanying table contrasts the capacity and production for the past six years, and states the percentage of activity for each.

BOXBOARD MILL ACTIVITY
1,000 of Tons ("000" Omitted)

	1926	1927	1928	1929	1930	1931
Capacity[1]	3,905	4,129	4,448	4,705	4,932	5,161
Production	2,952	2,995	3,368	3,580	3,372	3,303E
% Active	76%	73%	75%	76%	68%	64%E

[1] The daily capacity is multiplied by 300 days to give the yearly total.

During 1931 it will be noted that although the activity is estimated at but 64 per cent the tonnage output is found close to that of 1930.

Orders—Production

The tonnage, which the machine (or machines) in a mill is able to produce is termed "rated capacity." If the incoming orders and the production are divided by the rated capacity an expression for each can be had in percentages. Chart I is a composite of reporting mills showing these two sets of percentages monthly from 1929 to 1931 inclusive. The broken line on the chart represents incoming orders and the solid line production.

When orders are in excess of production the intervening space is left white and where orders overtake production the area is black.

For the most part during the past three years the rate of production has been greater than incoming orders. Starting with a bank of orders in January, 1929, equivalent to 9½ days at capacity running, the tonnage ahead of the machines at the close of 1931 has been reduced to less than four days. Customer demand for quick delivery and the urge to maintain the production schedules has brought this about, but it is an uneconomical condition calling for repeated changes with short runs on the machines, and making difficult a proper sequence in the operating program.

Seasonal Variations

The output of the box board mill is dependent upon the demand of the box makers, and their requirements in turn are based upon needs of their customers in the use of boxes for outward shipments. This sequence of demand results in a certain seasonal variation in the volume of orders received by the mills conforming with the shippers' activity, but anticipating it by the time customarily required to make the board and fabricate it into boxes.

In the box industry each order is made to customer's specifications and there is little or no opportunity for building up a stock ahead to tide over the periods of inactivity. The seasonal variations averaged for five years and the experience during 1931 are illustrated on the accompanying chart.

It will be noted that the trends for the paper board mills are about one month in advance of the container and folding box plants.

Box Board Prices

During the last half of 1927 box board prices began a decline which has continued irregularly to the present time. The price levels and the extent of the change is shown for the four principal grades of board from 1926-1931 inclusive. A simple average is made at the bottom of the table to indicate the trend of the movement, and the amount of the gain or loss over the previous year is entered on the last line.

BOXBOARD PRICES PER TON

	1926	1927	1928	1929	1930	1931
Test Liners	$61.50	65.00	57.50	51.50	40.50	33.50
Chip .016 (Rolls)	43.50	45.00	42.50	39.50	32.50	26.00
Single Man. Lined Chip	54.00	55.00	52.50	47.00	42.00	35.00
Newsb. No. 80 or Heavier	42.50	45.00	41.50	37.50	33.50	27.00
Average	50.40	52.50	48.50	43.90	37.10	30.20
Average Gain or Loss	....	+2.10	—4.00	—4.00	—6.80	—6.90

From 1927 to 1931 the drop in price was over 40 per cent, the greater portion of which occurred in the last two years. It is true that reductions in pulp and waste paper cost likewise were made, but these fell far short of compensating for the loss in sales prices. Mill labor and expense have been cut down but there remains a heavy burden of fixed charges incident to the large investment and the necessity of maintaining a skilled organization that cannot be reduced. Many mills have had to decide whether to continue selling below cost or suffer the loss of a complete shut-down. The amount of "distress" tonnage due to these conditions has forced prices even lower and prevented any stabilization of the market on a basis upon which improvement could be built.

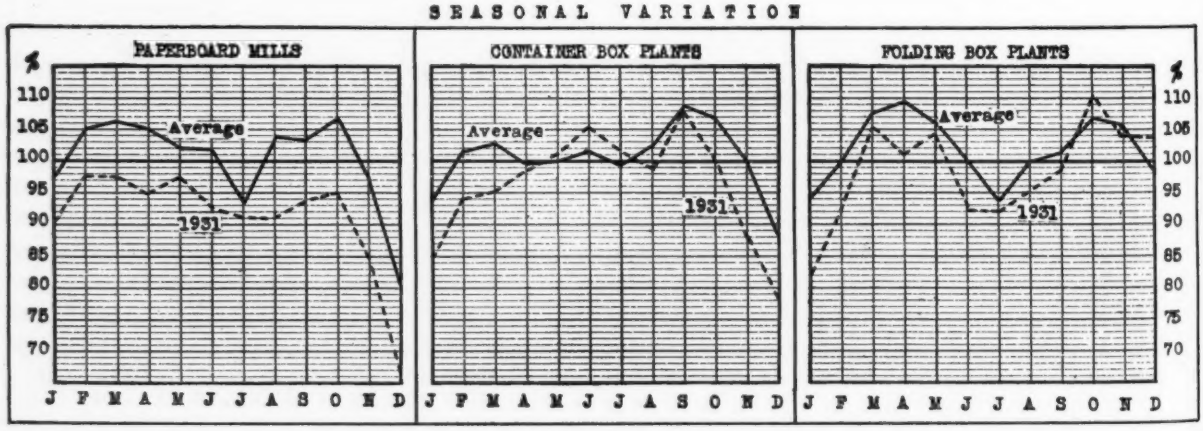


CHART 2.

The operating time for a period of 5 years is consolidated by months and expressed as a percentage above or below the average. This is the solid line drawn on the chart. The actual running time for 1930 is treated in like manner and is shown by a broken line.

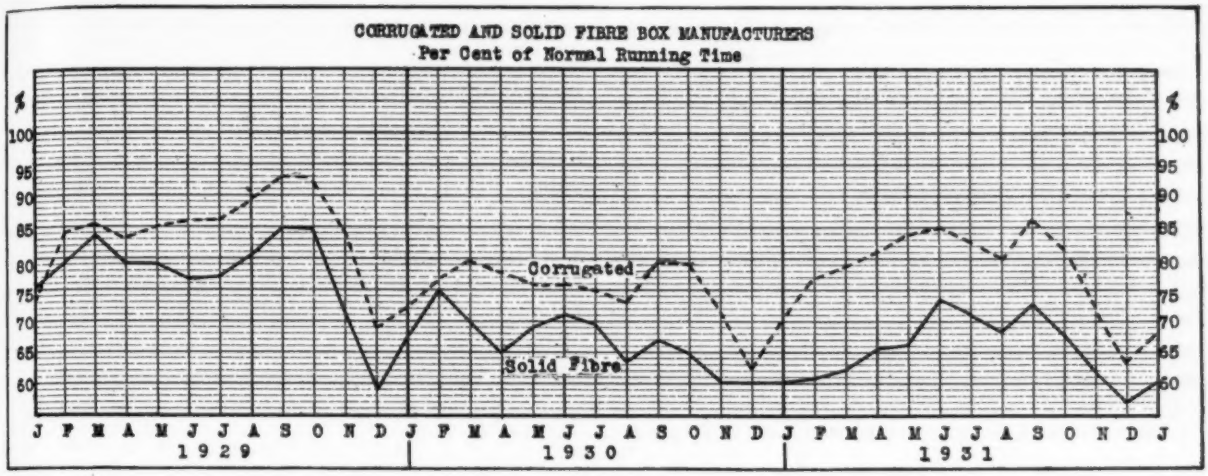


CHART 3.

The normal or usual hours of operation per week for the corrugating machines are multiplied by the number of machines to give the possible machine hours. By dividing this rated figure into the actual hours operated, the per cent of normal running time is found. The records of the solid fiber pasting machines are treated in a similar manner, and the two are charted by months to indicate the variation in plant activity.

Container Plants

Shipping containers are of two types, corrugated and solid fiber. The first process in the container plant is the building up of the box blank sheet from board supplied by the mills. The operations in making a corrugated sheet consist of combining by means of a strong adhesive a corrugated or fluted middle section with an outer and inner liner. The solid fiber box blank is likewise made from box board but is built up by pasting successive plies together to form a laminated board varying in thickness from 60 to 100 points (thousandths of an inch). The box making operations which follow, cut and score the box blank into sizes and dimensions specified by the customer to accommodate the particular article to be shipped.

Both types of boxes serve the same trade for the most part; but while some find better protection in transit in one than in the other, competitive prices often dictate the buyer's choice.

Production

The tons of box boards fabricated into boxes from 1926 to 1930, and the estimated amount for 1931 (final figure not yet available) are shown in the accompanying table. A division is made between corrugated and solid fiber and the total gain or loss each year over the preceding period is expressed in percentage.

CONTAINER PLANT TONNAGE

	1926	1927	1928	1929	1930	1931 E
Corrugated ..	974,000	1,025,300	1,133,300	1,281,000	1,179,200	1,165,000
Solid	632,000	666,300	704,000	729,900	683,400	668,000
Total	1,606,000	1,691,600	1,837,300	2,010,900	1,862,600	1,833,000
Per Cent ...	+7.6%	+5.4%	+8.6%	+9.4%	—7.4%	—1.6%

E—Estimated.

It will be seen that consistent gains occurred until 1930 when adverse business conditions not only cancelled the normal growth but carried the total 7 per cent below 1929. During 1931, compared with the low tonnage of the previous year, the difference is a loss of 1.6 per cent or 8.8 per cent if contrasted with the peak in 1929.

The expression "tons of boxes" is an unsatisfactory gauge of container production since the area of the box blank is the chief factor in measuring the output of the plant. Unfortunately, accurate statistics of area are not available, but it is known that the average weight per square foot has decreased steadily during the past three years. If this change in weight is applied to 1929-1930, the loss in square footage will be about 5 per cent, while for 1930-1931 there will be but a slight difference.

Seasonal Variation

As stated above, the demand throughout the industry has distinct seasonal trends, and for the container division Chart II shows a five-year average and the experience during 1931. The anticipated volume did not materialize during the first quarter, but was held back until June. Following this the remainder of the year conformed to expectation except that the fall recession came earlier and more rapidly than usual.

Container Plant Activity

The seasonal trends are a composite of both the corrugated and solid fiber activity, whereas each has its record of operations independent of the others. Chart III shows a comparison of the activity of the two for the three past years.

The corrugated plants have held above the solid fiber throughout the period with an increasing spread more marked in 1931 than previously. This has been due to the competitive price situation and because corrugated boxes being light in weight have been given preference for the shipment of some commodities when appreciable savings may result from the lesser freight charges.

Container Prices

The term "market" as applied to container prices has been a misnomer during the past year. No stability of price was maintained and quotations were made to meet conditions largely at the dictation of the buyer. The average prices obtained from past transactions show how serious the situation has been.

Stating the figures on a basis of the average price per 1,000 square feet the following table gives the record from 1926 to 1931, and also the gain or loss for each year over the preceding period.

CORRUGATED BOX PRICES PER M. SQ. FT.

	1926	1927	1928	1929	1930	1931
Box Prices	$10.10	10.70	9.05	7.95	7.10	5.75
Gain or Loss ...	....	+.60	—1.65	—1.10	—.85	—1.35

From the peak in 1927 at $10.70 the loss for 1931 is $4.95 or over 46 per cent. The major portion of this occurred in 1931 and the final price for the year is less than one half of the top in 1927. Viewing the sales figures from

a different angle there is available a statement of the average sales value per ton of shipments. The chart below shows this for corrugated container plants during the past three years together with the average cost of the grades of board commonly used. The sales price and the board price have both been reduced to a common denominator with previous averages taken as a base, and expressed in a percentage to afford ready comparison.

Much the same story is found here as on the previous price table but the comparison afforded with board costs shows that for the past two years sharper competition has existed between the box plants than among those who supply the box boards, as evidenced by the rates of decline.

Almost every commodity has been selling at successively lower prices during the past two years, but few industries have had five years of almost continuous decline, as experienced by box board and container plants.

Folding Box Makers

The makers of folding boxes use the product of the box board mill as their raw material but their plant operation is quite different from that of the container manufacturer. The box board is first printed to special design with as many copies as can be placed conveniently on a large sheet. The next process is the cutting and creasing to separate the individual cartons, and from here they pass through the gluing machine where the edges are joined and the product is tied in bundles for shipment.

Because the folding carton is used for an individual article or unit pack it finds its way into the hands of the ultimate consumer, and attractiveness of design often is an item of sales appeal. In catering to this feature, ingenuity and artistic ability play a prominent part in the sales organization.

During the past two years the volume of folding boxes has suffered but little change, whereas the set-up or rigid paper board box, has lost ground. For certain commodities the two are in a competitive position and apparently some business has been gained for the folding box because of price levels and the greater ease of handling and storing a collapsible carton than the more bulky rigid type.

Seasonal Activity

The periods of activity in the folding box industry vary in much the same manner as that of containers. The first quarter of the year, as will be seen by reference to Chart II, is more active than the last quarter; but in general the highs and lows are in conformity. During 1931 the operating ratios represented by the broken line remained below the five year average—the solid line—until October, when the usual advance went well above that anticipated.

Production

Analysis of the production record of identical plants in 1930 and 1931 show that in the East more orders were received but the quantity was smaller. In the West the runs were longer and in both sections the amount of time required on the printing presses was longer. The bank of orders ahead of the presses as expressed in days to run dropped from an average of 22 in 1930 to 17 in 1931. This reflects the same trend found in other industries, i. e., that purchases are delayed until supplies are nearly exhausted and as a consequence prompt deliveries are demanded.

Folding Box Prices

The folding box makers have suffered from the price decline that has swept over the country but not to the extent that has been witnessed in the container division. The sales managers have been quick to realize that novelty in color and special treatment in the design of a package, if properly stressed, would place their customers in the position of accepting a service for which a fair price was justified. This applies, to be sure, on the smaller orders but it was a distinct aid in bettering the average price level. Orders open to competitive bidding have been placed at ridiculously low figures and no one in the industry is satisfied with the year's showing.

Outlook for 1932

The excess capacity in the mill group will be further augmented this year by the increased output per hour of the existing machines. All indications point to a demand not greatly above that of 1931. The first half of the year, because of the sharp decline over the year end, is not expected to reach the totals of the corresponding period of a year ago, but the summer and fall months should be sufficiently active to bring the sum total up to, if not surpassing the 1931 record. In the container group much the same situation is in prospect. Price demoralization has now gone so far that many of the leaders in the industry feel that a stiffening in the market is the next move, and that any increase in demand will be a signal that the time is ripe for such a change. The folding box plants are pre-

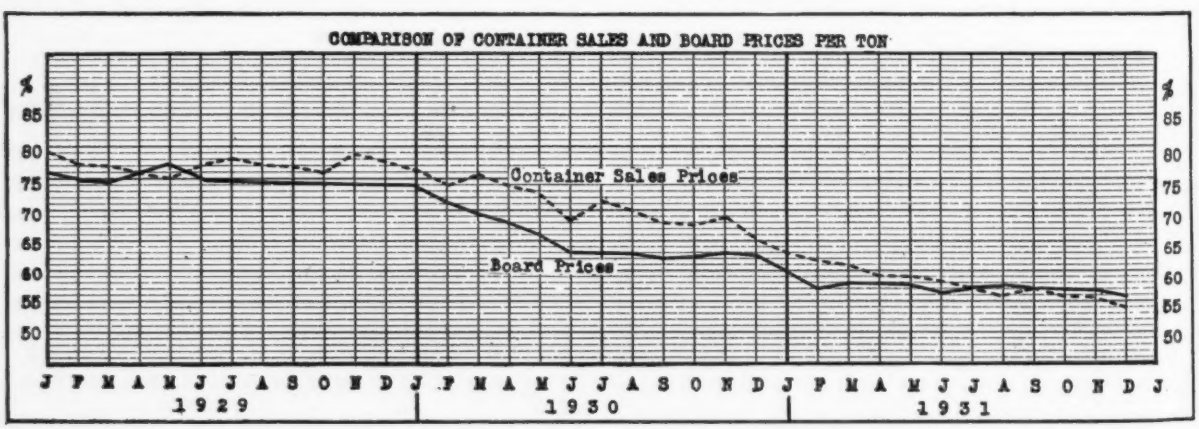


CHART 4

The total value of shipments of corrugated products is divided by the tons represented and stated in percentage of a previous average. The average market price of the raw materials entering into the product is weighted by the proportionate amount of each customarily used, and expressed as percentages comparable with the selling price. The relative fluctuations by months during the past three years is shown by plotting the two series of percentages on the same chart.

paring for a repetition of 1931 and are revising their operating schedules without anticipation of any marked increase in volume. New designs will be made and new fields developed for the output of cartons, but it seems doubtful that they will any more than serve to maintain the present averages.

Trade extension, quality and service, rather than price, are to be foremost in the sales policy for this year and strict economy, increased efficiency and further cost reductions are to be given first consideration in plant management. The paper board industry responds very quickly to changes in general business and if, through political or other sources, conditions improve, this industry will be one of the first to feel the betterment.

Demand for Paper Making Chemicals Decreases

By Guy A. Gardner, Manager Chemical Division, M. Gottesmann & Co., Inc., New York

NOW that 1931 has passed into history we can in some measure evaluate the record it has left us, and to say the least it is a disappointing story. Decreases in production and sales, in practically every branch of the chemical industry, were recorded, while prices continued the downward movement which started in 1930.

Paper makers chemicals, in common with most commodities, followed the general trend of the market. Contract prices for 1931 delivery of chlorine, soda ash, paper makers alum, and other chemicals used by pulp and paper makers, were at lower levels than for many years past, some of them in fact at the lowest figures on record.

The year 1931 opened with the market for chemicals extremely quiet and for most of the period withdrawals against contracts were seldom up to quota, resulting in a weak spot-market where prices frequently were quoted below the contract figures. As might be expected, this condition created a lack of confidence among buyers, many of whom curtailed their purchases to immediate requirements.

Several times during the year efforts were made to stabilize prices, especially as the fall contracting season approached, but these efforts met with little success except in one or two instances. As a result, contract prices for 1932 are in most cases no higher than 1931 and on many items the prices for this year are at new low levels. The last few weeks of the year, however, showed a somewhat firmer tone, and there was some slight improvement in quotations on several important chemicals.

Since the first of the new year prices have undergone little change and although it cannot be said that demand has improved to any great extent, still there is a better feeling among chemical manufacturers and it is believed that the worst has been seen and a gradual improvement is looked forward to with increased confidence.

So far as the outlook for this year is concerned, every one seems to agree that 1931 has been a most difficult period and that 1932 will be a lot better, although the anticipated betterment may not occur at once. However, if we go into the new year with the idea that things will be better and a strong resolution to bring this much desired state of affairs about, we shall be that much nearer making our wishes come true.

Caustic Soda and Soda Ash

Contract prices for the Alkalis were unchanged from the previous year for 1932 delivery. Efforts were made to secure better prices, but due to the dullness of the market, were not particularly successful. Soda ash light in bags is quoted at $1.25 per 100 lbs. Caustic soda solid in drums at $2.50 per 100 lbs. in car load lots at works.

Sulphate of Alumina

During the year the price of paper makers alum gradually improved and contracts for 1932 were made at a slightly better price than the prevailing figure for 1931. Commercial grades are quoted at $1.25 per 100 lbs. in bags, iron free at $1.90 per 100 lbs. in car load lots at works.

Salt Cake

Pulp manufacturers and glass makers held their requirements of salt cake to a minimum during the year and other consuming industries were purchasing only for immediate requirements. Prices, however, were well maintained during most of the period although at times offers of spot lots were made at lower figures. Contract prices for 1932 were in line with prices made in the previous year.

Chlorine

The demand for chlorine for the paper, pulp and textile industries was spotty during the year and efforts to raise the price from the $1.75 contract figure of 1931, met with little success.

China Clay

The break up of the English China Clay Association last year together with Great Britain going off the gold standard, brought about several reductions in the price of the imported clays. Domestic clay prices were fairly well maintained, although the requirements of the paper trade were considerably reduced for most of the period.

Sulphur

While demand for sulphur fell off considerably during the year the price held firmly and no change was made in the contract price for 1932. Contract tonnage is quoted at $18.00 per long ton, with usual advance for spot shipment.

Rolland Paper Co. Has Satisfactory Year

At the annual meeting of the Rolland Paper Company, held in Montreal, a satisfactory report on the operations during 1931 was presented. Earnings for the period, after operating expenses, all taxes and provision for bad and doubtful debts, amounted to $346,876, as compared with $379,358 for the previous year, and were equivalent to 2.34 times bond interest including premium on American funds. After providing $84,000 for depreciation, against $72,000 in 1930, net available for dividends was $114,670, as compared with $169,858. The 1931 net earnings were equal to 1.27 times the dividend requirement of $90,000 on the company's 6 per cent, preferred shares. Deduction of preferred dividend and proportion of organization expenses written off left a net addition to surplus of $22,670, which with a credit of $8,500 from insurance reserve brings the total profit and loss surplus up to $312,204 as at December 31 last.

Kraft Industry Suffers From Unstable Prices

By O. M. Porter, Secretary, Kraft Institute

THE year 1931 has its full measure of grief for the kraft industry, but it also served a useful purpose in that the industry was forced to reduce its costs, increase the efficiency of its operations and develop new outlets for its products.

1931 was somewhat of a blessing in disguise in that the character and extent of its destructive competition apparently convinced all of the kraft paper manufacturers that the solution of their problems and the profitable progress of their industry could be obtained only through honest and industry-wide co-operation, with the individual units basing their policies both on facts and on the necessity of keeping their operations in harmony with a broad, comprehensive program designed to insure the whole industry's stabilization and progress.

Demand Surprisingly Stable

Despite a surprisingly stable demand, all branches of the industry suffered from the instability of prices in 1931, and the effort to sell more goods than the market would absorb. The existing condition of excess capacity was further aggravated by the bringing in of new tonnage during the year. This effort, which was very general throughout the industry, to produce and sell more than the market could absorb, made normal marketing of the products of the industry impossible. The result was cut-throat competition, a breakdown of co-operative effort, loss of that confidence among the manufacturers without which such effort cannot be successful, and almost complete demoralization.

Fortunately, a halt was called before irreparable damage had been done, although the losses from this internecine warfare were staggering. As the result of courageous leadership on the part of one manufacturer, ably supported by intelligent co-operation from the rest of the industry, and untiring effort on the part of those intrusted with the carrying out of an industry-wide program for its profitable stabilization, the industry has pulled itself together and gone to work—marshaling its forces against the common enemy of over-production, cut-throat competition and uneconomic, profit-taking merchandising practices. The result has been such as to instill courage in the hearts of those whose faith in the ability of the industry to solve its own problems was almost completely shattered, and to strengthen the confidence of all in the ultimate success of this timely and constructive program.

New Prices Announced

Dark days are ahead. It always seems darkest just before dawn. New prices have been announced, which, while not adequate, are more commensurate with average costs than those to which there seemed to have been no bottom during the past few months. It is but natural that jobbers and converters will exhaust their stocks and make every effort to replace them at the bottom prices of 1931 before they will commence to buy freely at the prices announced by the manufacturers early in January, 1932. If the manufacturers will courageously resist such effort in the knowledge that the establishment of higher prices means more stable and satisfactory conditions for everybody, and if there will be commensurate advances in converters' products and jobbers' resale prices, this Zero hour will pass and the objective will have been gained—to the ultimate satisfaction of all concerned. Fortitude and the knowledge of competitive co-operation will carry the industry through to happier days.

Just what was the kraft situation during 1931? It is estimated that the kraft paper mills of the United States now have a capacity of pretty close to 4,000 tons a day. During 1931 it is probable that the volume of orders throughout the whole industry did not exceed 65 per cent of this capacity. It is significant, however, that not only did the shipments of kraft paper remain fairly constant during 1931, but the rate of demand in relation to capacity, probably did not vary more than one per cent from that of 1929 and 1930. Thus, while there was a fairly normal and constant demand, there were wide fluctuations in price, which kept the market upset and brought heavy losses both to the manufacturers and converters and to the merchants and jobbers.

Quotations Fluctuate

1931 started out with a price on wrapping paper of about 3¼ delivered. This advanced to a mid-summer high of 3¾ and then slumped back to a record low of about 2⅝. Prices now are again firm at 3¼. 3¾ is $75.00 a ton; 2⅝ is $52.50—a difference of $22.50 a ton. The industry ships on an average 16,000 tons of kraft paper a week. 16,000 × $22.50 = $360,000.00. This is the price the kraft industry was paying for its demoralization. This does not include the losses to jobbers and converters, which probably would add another $100,000 a week. Is it any wonder that the industry was rapidly losing out in the stress of this modern competition and that the stocks of leading kraft mills ceased even to be quoted regularly on the exchanges of the country?

Happily, however, that condition has changed and there is a determination on the part of the industry to solve its problems through honest co-operation based on accurate factual data. If production is kept in balance with demand and the kraft paper manufacturers and their principal converting outlets reduce the volume of their shipments in 1932 by as little as 10 per cent from that which was shipped in 1931, a similar article written a year from now will not be headed "Kraft Industry Suffers From Unstable Prices," but, rather, "Kraft Profits in 1932."

To Start Capron Mill at New Hartford

The Superfine Paper Mills, Inc., Clayville, N. Y. has purchased an extensive factory building at New Hartford, N. Y. and is moving a portion of its finishing machinery from the Clayville mill to these new quarters. The aquisition of the new Hartford property will relieve the congestion at Clayville and afford greater facilities for handling the constantly increasing business of the corporation.

The new plant will be known as the Capron Mill. A new paper machine, just completed by the Bagley & Sewall Company of Watertown, N. Y. will be installed there, and beating equipment built by Dilts Machine Works, Inc., Fulton, N. Y. will be added. It is expected the plant will be in operation about the middle of March.

The Superfine corporation is operating three machines at Clayville on a special product of cellulose wadding used by their affiliated company, the Sterilek Company of Utica, N. Y.

Pulp Industry Hurt by Unsettled Conditions

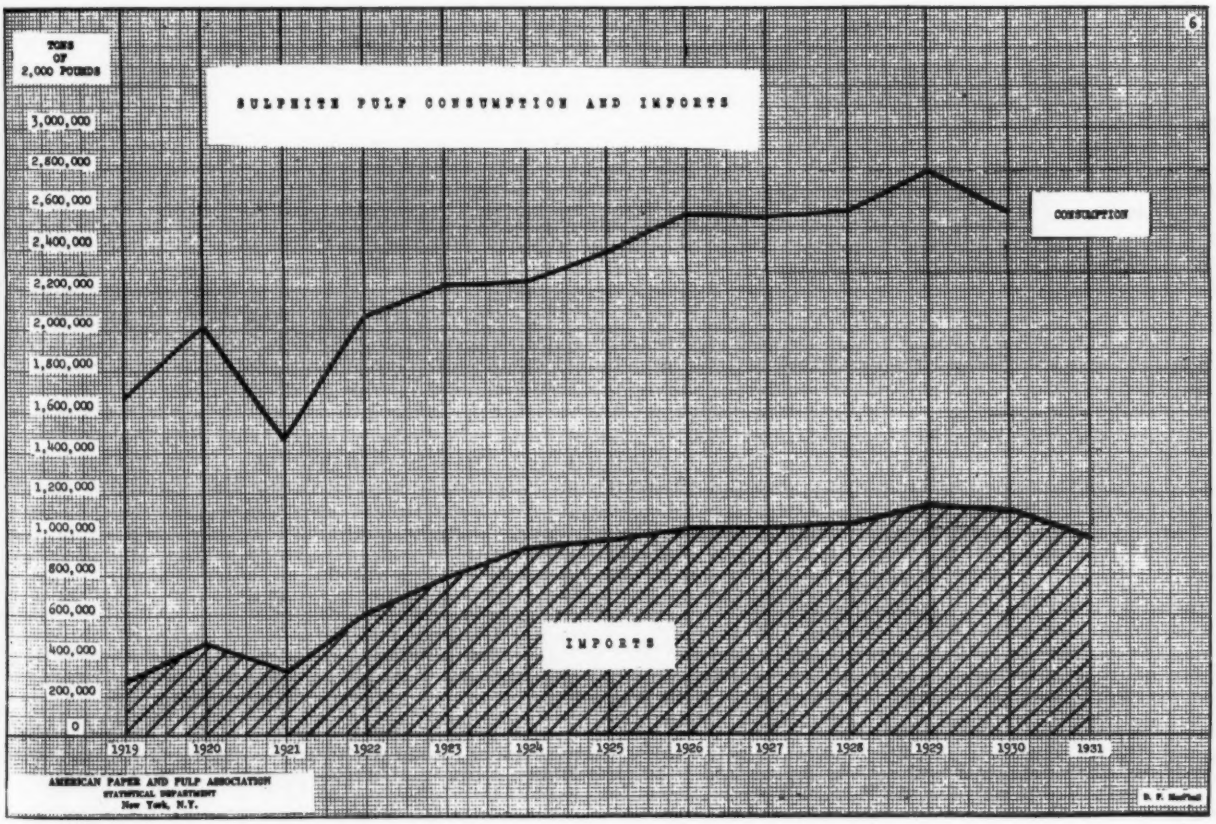
By O. F. Swanson, Sales Manager, J. Andersen & Co., and the Pulp & Paper Trading Co.

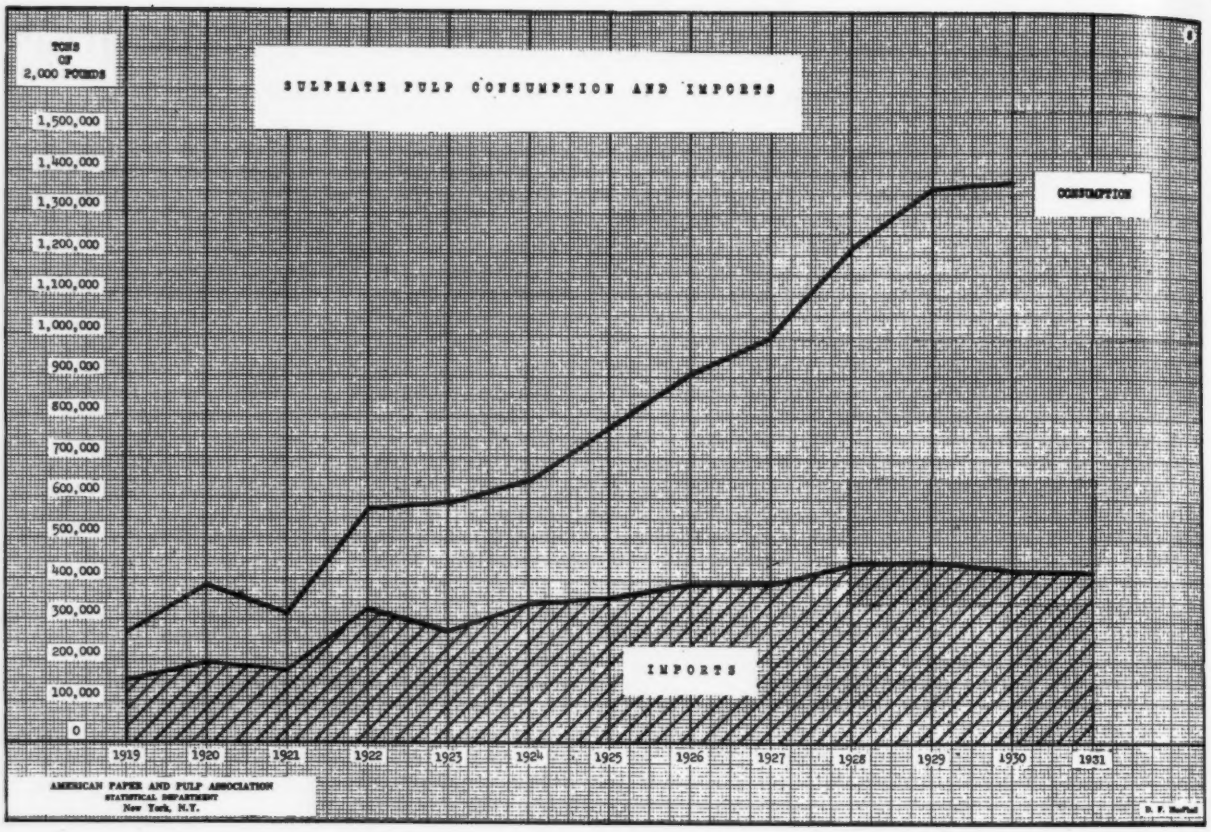
IN the quest for paper making materials, the greatest discovery during the last 100 years is wood pulp—chemical and mechanical—and taking into consideration that 80 per cent of all paper either contains a certain percentage of some kind of wood pulp or is made from this product exclusively, it is without question the most important raw material in the paper industry. Prior to this discovery, rag stock occupied this position and was without significant competition for several hundred years, but, when in 1872 Mr. Ekman built the first sulphite pulp mill in the world at Bergvik, Sweden, the baby of a gigantic industry was born and, with the first shipment of this mill to England in 1874 a new era in the paper industry began. Obviously Mr. Ekman had optimistic views concerning the future of this new product, but it is doubtful that he, or anyone else, expected the tremendous growth since attained by this new business, which now involves millions of tons annually. Likewise its further possibilities are today impossible to visualize, but it is safe to predict that the saturation point is still at a considerable distance. The persistent research work in wood chemistry and fiber purification is bound again to bear fruit and based upon rather recent and excellent accomplishments in this field by the Brown Company and others, the future will reveal other important developments in wood pulp.

Chemistry of Cellulose Complex

The chemistry of cellulose is complex and, although progress has been made during the last decade, it has not yet been solved, but great strides, both in scientific developments and mechanical operations have been made. Keen competition is forcing the industry to be on the alert for necessary changes in qualities of pulp to comply with the more exacting requirements by modernized paper and board mills usually equipped with laboratories, supervised by especially trained chemists where the various properties of the pulp are first determined and where subsequent deliveries are checked prior to its use in the mills. It is not so long ago that the suitability of pulp was determined by the appearance of a small sample submitted to the buyer. This procedure was practically a thing of the past last year, and before any changes of pulp were made, various brands of the type required were tested in the buyers' laboratories. This is a rather cumbersome method of doing business, but it is unquestionably an improvement over the old way of more-or-less guesswork, and if not carried too far, should prove its worth.

Aside from the usual requirements, such as strength, color and cleanliness, freeness is now usually and Alpha content quite frequently specified. Previously, no particular attention was paid to the freeness or slowness of a strong pulp and it was always accepted as something unavoidable but, not so last year, and the delicate operation of producing a strong and, at the same time, free sulphite fiber has been accomplished and almost any mill can now produce a strong pulp without its being slow. While the





Alpha content is considered a very important factor in bleached chemical pulp, it has, as yet, not played any noteworthy role in the case of unbleached pulp. Alpha content in wood pulp should be an indication to what extent the woody tissue of the fiber has been removed but a correct interpretation of Alpha content tests is difficult on account of the variation in different types of fibers in percentage and also in quality.

Wood pulp with as high as 98 per cent Alpha is made but Alpha pulp for paper making usually varies from 92 per cent to 94 per cent Alpha and ordinary grades of wood pulp run about 85 per cent. However, a high Alpha content should be desirable for certain grades of paper because of the increased flexibility it gives to the paper as well as other favorable qualities. Spruce is still considered the best wood for wood pulp, but other grades of soft wood are also extensively and successfully used. Hard wood, Bamboo, Esparto, etc., can be and are used to some extent and, during the last year, experiments with a rapid-growth Cuban tree have been carried on both in laboratories and paper mills and as this new pulp, named Estape Fiber, has many favorable properties, it will, no doubt, soon take its place in the industry as a regular source of supply for mills requiring strong bleached pulp.

Unsatisfactory Price Situation

A review of the pulp business of 1931 discloses very few unexpected incidents. There were no signs of improvement in tonnage or prices at the beginning of the year and, as the year advanced, none materialized. The industry encountered the anticipated Norwegian strike which, although it lasted nearly half a year, and undoubtedly was very costly to Norway, did not seem to make the slightest difference in the American market, in regard to prices and supplies. It was finally settled in September and labor peace was again restored to Norway. Otherwise, with a few minor exceptions, the pulp mills were able to operate without interference, as far as labor and strikes are concerned but no group of pulp mills were running at full capacity. The main reason for this was over production. Compared with other years, prices on all grades of pulp were very unsatisfactory and, if any pulp mill was able to show a profit, at the end of the year, it was a miracle. It is said that "Experience is the Best Teacher" and, if so, the vast number of pupils the world over were taught a few lessons last year that they will never forget.

The folly of price cutting and that it does not provide means for the disposal of an over production was both taught and demonstrated and the necessity of curtailing production was another important subject. This was agreed upon by the sulphite industry of Sweden, Norway, Finland, Germany, Austria, Czechoslovakia and Memelland. At first, a 15 per cent curtailment in sulphite was arranged for but, in June, 1931, this was increased to 30 per cent for a period of one year. The situation has, however, been so accentuated that even this rather drastic measure failed to stop the gradual decline in prices and, by the end of the year, prices on all grades were on a lower level than ever before. However, an average price on chemical pulp for the entire year would probably be closer to normalcy than has been the case in several preceding and abnormal years. The difference in quality did no longer justify the difference in prices because of the fact that the quality of the majority of bleached grades reached the point where they frequently replaced the so-called expensive brands. In the future, there will not be the great difference in prices.

Bleached sulphite appeared to have suffered most in the

price cutting campaign and standard domestic grades were reported as low as 2¼ cents per pound, f.o.b. railroad cars consumers' mills and imported as low as 2 cents per pound on dock Atlantic ports. Up to the end of the year, these are record breaking low prices. Kraft or sulphate pulp was the least affected because it had already suffered severe price reductions in 1930 and the price level at the end of 1931 was from 1.50 cents to 1.70 cents per pound on dock Atlantic ports or about the same as quoted in the beginning of the year. During the summer months, a few sales were reported at slightly lower prices. Although there were no arrangements between the manufacturers abroad for curtailment of the production of this type of pulp, it is, nevertheless, estimated at about 180,000 tons, compared with approximately 300,000 tons of sulphite.

Ground Wood Output Curtailed

The Swedish, Norwegian and Finnish ground wood mills also reached an agreement to curtail their production of wet pulp, amounting to the respectable figure of 50 per cent of the mills capacity, but when the Scandinavian cartel broke up, intensive competition and lowering of prices followed. The difference in prices in January and December is estimated at 20 per cent. It is significant that in spite of the substantial decrease in production it was not sufficient to maintain prices, which should indicate a corresponding decrease in tonnages of products made from ground wood or possibly the inability of the so called converting mills to compete with paper mills using their own pulp or both. In any event the supply was in excess of demand. For the first time as far back as I can recall, imported prime unbleached sulphite was reported sold below $30.00 per short ton on dock usual Atlantic ports, and domestic grades at equivalent prices f.o.b. consumers mills or at equally low or lower prices on the same docks. On account of quality, the imported unbleached sulphite was usually favored, price and other conditions being equal, but the general run of domestic bleached sulphite, the quality of which is now frequently considered superior to imported grades and more desirable for certain purposes was without question given the preference.

Foreign Exchange Affects Situation

It is, however, likely that the question of price was another very important factor and it is doubtful that the foreign pulp mills kept the pace with domestic mills in price cutting during the first nine months, but from the time the Bank of England announced its decision on September 21 to suspend the Gold Standard and was shortly followed by the Scandinavian countries and Finland, the change in the exchange situation apparently made it possible for these countries to offer their grades of bleached sulphite at about the same prices quoted on the domestic grades. This appeared to be the situation at the close of the year and was the cause of considerable comment by domestic pulp manufacturers, many of whom feel this competition keenly and are in favor of placing a duty on imported wood pulp. The matter is of world wide interest and as our Government is now making a thorough survey of the situation, it will remove the suspense regarding this question in due course.

There is, however, another powerful group of citizens which is not only opposed to an import duty on wood pulp, but would favor a universal lowering of tariffs because, in their opinion, the fundamentals for success in business rest upon trading between nations and not on so-called protective tariffs. Both groups being heavily armed, there is a real battle in sight before the question is finally settled. In the meantime, new pulp mills have started the distribution of their production of bleached and unbleached sulphite and kraft pulp, and if business in general does not improve materially, the market will be flooded with pulp. What there is in store for the pulp industry at large is easily conceived and sublime confidence in the future will not be enough to carry the weaker mills through because, regardless of quality and price, the old masters, "Supply and Demand," will continue to rule. It will mean the survival of the fittest.

For several years ports on the Great Lakes have received cargoes of pulp wood from both domestic and foreign pulp mills, but in spite of the increased tonnage to these ports last year, the opinion regarding their advantages, if any, over Atlantic ports, is still divided. Albany has also been included and is now receiving and handling ship cargoes.

As previously intimated, it is doubtful that anyone in the pulp business, regardless of his connection or locality, escaped the effects of the strain caused by the unsettled conditions last year, and it probably would be impossible to find a single person among the survivors who could truthfully say that he has never referred to last year in unprintable language, but as the poor thing has now come to an end, why rub it in further—let it rest and "Pax vobiscum."

At the time of this writing there appears to be a violent trade war in which nearly every nation is involved, but as this, in my humble opinion, is a repetition of an antiquated method to restore prosperity, it cannot last, and as soon as business in general makes a definite advance, the pulp industry will promptly follow. In the meantime there is a feeling that the worst is over and that we are passing through to better conditions.

Pulp Mills Buying Hemlock Chips

Hemlock chips from British Columbia are now being shipped to pulp mills at Port Townsend, Wash., at the rate of 300 to 350 tons per day. The hemlock chips are being produced by the Wood and English Logging Company at their plant adjoining Vancouver. Machinery was recently installed for chipping purposes at a cost of $65,000.

Chipping Machinery was put in to utilize waste ends previously burned but at the present time the market for the chips is proving more lucrative and dependable than the market for logs and lumber. Under present conditions the sawmill is being operated as a breakdown plant for the chipping equipment and all hemlock, larch and balsam logs are completely reduced to the pulp material.

Nine scows, seven of which are reputed to be the largest on the coast, are kept busy transporting the chips. These seven scows, built by the Vancouver Tugboat Company, are 110 feet long, with a beam of 38 feet and have a carrying capacity of 750 tons each.

Wood chipping equipment has been installed at the Hammond Cedar Company's plant on the Fraser and as soon as present cedar operations are out of the way, wood chip shipments will be made from there.

U. S. Gypsum Installs New Machines

The Smith & Winchester Manufacturer Company, South Windham, Conn., have recently completed several orders for their paper bag making machines, among them being two Heavy Duty Tuber bag machines for the United States Gypsum Company, of Geneva, Ohio, in addition to a two-thirds Heavy Duty and a one-third Barrell Bottomer, for making multi-wall pasted valve bags.

Regional Competitive Chances and Pulp Manufacturing Costs*

By C. W. Boyce, Sec. American Paper & Pulp Association

TO-DAY'S pulp prices range from 35 to 45 per cent lower than the levels of two years ago. They have been forced to these low records in a fierce competition in which all producing countries have participated. The price war has occurred chiefly on the American battlefield for the largest advantages are in the United States. But the fact that new low cost American production has entered the eastern markets, also has contributed to fix the locale of the battle. Whatever its ultimate results, its immediate effect is to focus attention upon manufacturing costs. They have become more and more important as the international struggle has progressed, for prices have gone below over all costs and are now threatening the bare out-of-pocket costs of the most favorable mills.

Since practically all pulp exporting countries forsook gold standards in the fall of 1931, the competition has assumed an added viciousness. The domestic producer is caught, at least temporarily, in a position that he cannot himself master. He is being subjected to a too severe squeezing process. But he could not have escaped a certain amount of squeezing. Regardless of currency debasement, the top-heavy structure of the world wood pulp industry was bound to say; however, there was no reason for it to crash.

The reasons for realignment of pulp prices have been lurking in the background of the industry for the past decade. They hinge upon overextension of manufacturing facilities; but that itself turns upon substitution of sulphate pulp for sulphite in many products, and the substitution of other woods for spruce in sulphite pulp. The world suddenly became aware of the fact that the chemical pulp industries were no longer completely dominated by spruce pulpwood. The elaborate economies built up around the spruce pulp industries in spite of the rapid encroachment of the new industries, were bound to suffer somewhat, sometime when prices were readjusted. They have been crushed down upon, however, by a competitive force that more nearly constitutes a cataclysm than a readjustment.

A commerce so distorted by inequalities as the world pulp trade is today, cannot be gauged by prices. Judgment must seek deeper, more stable fundamentals; it must seek true costs. Upon cost data it may be safely formulated. Current costs possess a double significance for they not only indicate present position but that of the future as well; for the industry is in transition. It is this aspect particularly that I wish to discuss.

A recent study of pulp manufacturing costs has made available comparative regional data as of the first half of 1931. With these as a basis it is possible to point to definite readjustments that must take place in the various regions if they are to compete in national markets. It is interesting to note that present movements are in the direction of the indicated readjustments.

In the far flung American marketing system by which the paper production of one region using materials of a certain origin, competes with mills of another region which perhaps draw their materials from an entirely different source, paper prices are fixed in common markets. Because of their relationship to paper prices, pulp prices are roughly fixed also in the process. The competitive power of a region may be determined by its cost advantages in markets of sufficient tonnage capacity to absorb its production. New York and Chicago may be selected as typical common markets. The status of the competing regions may be evaluated by adding transportation charges to each of these markets, to actual pulp costs in the regions.

New England pulp, for instance, can be transported to the New York market for $5.50 and to Chicago for $9.00 per ton. New York and Pennsylvania pulp reaches New York City for $5.25 and Chicago for $7.75. The Lake States mills have of course a low freight rate to Chicago which averages $3.80 per ton; the New York rate, obviously high because of the distance, averages $11.50. Rail shipments from the South reach New York for $13.25 and Chicago for $9.40 per ton; the New York rate may be scaled to about $5.00 per ton by water shipment. The all-rail rate from the Pacific Coast to New York is $26.00 per ton as compared with $20.00 a ton to Chicago. The water rate including a liberal loading charge on the Pacific Coast is approximately $7.50 a ton to New York.

Pulp Costs Delivered in New York and Chicago

The delivered cost of pulp from the various producing regions is indicated with fair accuracy by adding these transportation charges to the over-all regional pulp manufacturing costs. Obviously, the lowest delivered cost is the most attractive; producers in other regions must be guided by it.

It is plain that southern and western water shipped products can compete with New England and Middle Atlantic States rail-shipped products in New York. In the Chicago market the Lake States manufacturers are protected by the relative isolation of the market; they possess an advantage of $5.00 per ton over the South and $15.00 per ton over the West.

In the New York market New England mechanical pulp costing $31.00 per ton competes with Middle Atlantic States pulp at $34.00 and with water-borne Pacific Coast pulp at $29.00. The Middle Atlantic States figure covers mechanical pulp for specialties as well as for news print; in the former the manufacturing costs are somewhat greater. Mechanical pulp for news print is delivered in New York from Middle Atlantic States mills at a price comparable with that of the New England product. The spread in this market amounting to $2.00 a ton may be offset by differences in the costs of converting the pulp into news print. It has not been enough to encourage greatly the expansion of western production of mechanical pulp products for delivery in New York.

In Chicago mechanical pulp from the Lake States costing $32.00 per ton has a $2.00 to $4.00 differential over the eastern producing regions and a $10.00 advantage over western rail-shipped products. Obviously little mechanical pulp is shipped from either the West or East into the Chi-

* Delivered at the joint meeting of the Fibrous Raw Materials Committee of the Technical Association of the Pulp and Paper Industry and the Pulpwood Department of the American Paper and Pulp Association, New York, Feb. 15, 1932.

cago Market. The competition is chiefly from Canada and in the form of news print paper.

Unbleached sulphite from the West shipped by water enters the New York market for about $38.00 which is at least $12.00 below the cost of pulp from nearby supplying regions. In Chicago, however, Lake States producers with a delivered cost of $46.00 a ton have a $4.00 advantage over the West and a $9.00 advantage over the eastern regions. In so far as Lake States production suffices, Chicago is a natural market. In New York western pulp competes chiefly with imported pulp, both of which possess cost advantages over the pulp from the neighboring regions. The cost spreads in the New York market explain the fact that the national manufacture of unbleached sulphite pulp in the United States has not risen above the levels established in 1920. There has been, it is true, an increase in the West, but it no more than compensates for the decrease in the East. The Western unbleached sulphites have not yet become firmly established in eastern markets.

Imports of unbleached sulphite pulp, however, particularly from overseas countries, have increased rapidly. In 1931, for instance, 608,000 tons were received from outside the national boundaries, of which 339,000 tons came from Sweden, 109,000 tons from Finland, 99,000 from Canada and the rest from Norway, Germany and other countries. Imports from Canada have decreased rapidly, in fact, the 1931 shipments were 114,000 tons less than the 1929 shipments. Sweden and Finland have largely taken over the trade. These countries sold unbleached sulphite pulp in the New York market for $38.00 to $42.50 a ton in September, 1931, but since then their deliveries have been as low as $29.00 a ton, an extremely low price made possible by the depreciated exchange. Before the debasement of currency occurred, western pulp costs delivered in New York, approximately balanced with prices at which foreign pulp was being sold. Neither western nor foreign producers, however, profited in the competition.

In bleached sulphite pulp the West with a New York delivered cost of $47.50 a ton has about the same advantage over eastern producing regions as it has in unbleached sulphite. Here again, competition is between the West and imports, bleached sulphite pulp being drawn from Canada, Germany, Sweden and Norway in the order named to an amount that totaled in 1931, 361,000 tons. Imported pulps sold for around $50.00 delivered in New York in September, 1931; but since then delivereies have been made as low as $38.50. It is significant to note that the imports of bleached sulphite pulp in 1931 are almost identical in quantity with the 1930 imports and but 13,000 tons less than the all-time peak in 1929. It is plain that domestic producers with their higher costs have been forced to absorb the total reduction in national consumption, the higher cost eastern manufacturers taking the greatest loss. Since currency depreciation foreign producers have been consistently able to undersell western manufacturers.

With a delivered cost of 56.00 a ton in Chicago. Lake States bleached sulphite pulp manufacturers have an advantage over all other domestic shippers to that market. During the past year, however, they have met serious competition from Canada and from overseas producers who are now making all-water shipments to Lake States converting mills. Some deliveries have been made as low as $47.00 a ton which is $9.00 less than the local producers costs, and Canadian pulp has sold down to $43.00 a ton.

In sulphate pulp the South has an advantage over the Lake States in both the Chicago and the New York market. On comparable products the advantage in Chicago is approximately $6.00 per ton, but it is over $13.00 in New York. The competition in the Lake States is keen, the local producers absorbing at least $6.00 per ton to meet the southern manufacturers on a comparable basis.

In New York imported sulphate pulp enters the competition, being delivered to northern converting mills at a somewhat lower cost than southern pulp. The United States imported in 1931, 420,000 tons of sulphate pulp, nearly 300,000 tons of which came from Sweden. Swedish sulphate pulp has been delivered ex-dock New York for $28.50 per ton.

These broad comparisons indicate the competitive situation so far as pulp costs are concerned. They throw considerable light upon the position of the various producing regions in the national and international competition. The advantage as determined by comparative costs is not the whole story; elements of quality and of technical control destroy a relatively wide pulp cost spread. The cost differentials are, nevertheless, indicative, and they are supported by the trends of production in the various regions and in the competing countries.

Every manufacturer of pulp is now searching for means of bettering his position in this competition. How he may do so, is better shown in a consideration of the elements of cost in pulp production.

Conversion Costs

Mill conversion costs for mechanical pulp mills show a regional spread from $7.00 a ton in the Middle Atlantic States to $9.75 a ton in both the Lake States and the Pacific Coast; the United States average is $8.25. The Middle Atlantic States low average is due to a large number of cases of special power conditions. The Lake States and western average are high because the power costs for reporting mills were above the average.

The spread in conversion costs of bleached sulphite pulp are relatively insignificant, varying from $20.25 in the West to $22.50 in the Lake States. The western advantage lies largely in its cheaper bleaching. The Lake States is high because of its higher sulphur costs. In unbleached sulphite pulp the range is from $12.00 to $14.00 a ton. Here, the Middle Atlantic States being more accessible to sulphur shipments, have an advantage. They also have an advantage in coal costs. Otherwise the figures are roughly similar.

In sulphate pulp the South with its cheaper labor and with its lower fuel costs, possesses a mill conversion advantage of approximately $4.00 a ton over the Lake States. This is not equal to the difference in delivered costs in Chicago.

Expense Items

The expense items include fixed charges (depreciation, insurance, taxes) and indirect manufacturing expenses. In the regional alignments there is no consistently wide variation. Mills in the same region may show a much wider spread than the regional averages. Expense items in mechanical pulp for the United States as a whole approximate $2.50 per ton; in bleached sulphite pulp $5.00 a ton; in unbleached sulphite pulp $3.25 a ton and in sulphate pulp $5.30 a ton. These items, of course, vary with a number of conditions, chief among which may be the accounting system. For purposes of this discussion the national averages may be applied to all mills of the same type in all regions.

Wood Costs

The wide differences in wood costs are directly responsible for the delivered market spreads. They are more than can be offset by the transportation charge differentials.

Wood costs per ton of mechanical pulp vary from $9.00 per ton in the West to $19.00 in the Middle Atlantic States.

These costs are not, it is true, costs of wood that is being delivered at the present time; they are, rather costs of wood that is being manufactured into pulp at the present time. The spread of $10.00 between the high and the low cost in the New York market competition is offset by the difference of $2.50 a ton in transportation charge and by a difference of $4.00 in mill conversion costs in the case of news print. To meet producers upon a comparable basis in New York, wood costs must be reduced at least $3.00 per cord in the Middle Atlantic States region. In Chicago, the Lake States producers possess in their transportation differential sufficient spread to cover their greater wood costs as compared with the Pacific Coast. Both markets however, are dominated by Canadian news print to such an extent that there is little interregional competition except from New England. Most domestic news print mills can meet normal Canadian competition; neither can meet overseas news print which has sold much under $40.00 per ton delivered since currency depreciation.

In bleached sulphite pulp the wood cost variations are from $14.00 per ton in the West to $37.50 a ton in the Middle Atlantic states. It is plain that the eastern freight rate advantage in New York over the western cargo rates is far from sufficient to make up this spread. In the case of New England the spread in transportation is about $2.00 while the spread in wood costs is about $18.00 or approximately $9.00 per cord of wood. If mill conversion and expense items remain equal, it is plain that wood costs must be reduced by approximately one-half to compete in New York. The spreads of wood costs for unbleached sulphite pulp are not so great, due largely to the greater yields in the East. The spread between New England and western pulp delivered to the New York market would amount approximately to $13.00 per ton or $6.50 per cord of wood. To reach comparable market basis, New England wood costs should be reduced to about $16.00 per ton of unbleached sulphite.

In the Chicago market the actual spread between the West and the Lake States in wood costs is $12.00 a ton in bleached sulphite and $9.00 in unbleached sulphite. The transportation cost spreads between each region and Chicago nearly offset this difference.

In sulphate pulp the competition centers largely in the Chicago market between the South and the Lake States mills. The spread of wood costs between these two regions is $9.50 per ton of pulp. The South using second growth pine cut by local farmers in their wood lots and delivered to the mill with their own teams, obtains its wood under $5.00 per cord. In the Lake States most mills are situated some distance from the forests and the transportation between the forest and the mill is higher. Also the costs of woods operations or the prices at which farmers will sell their wood are somewhat higher because of the differences in wage rates. To meet in the Chicago market on a comparable basis, however, wood costs in the Lake States should be reduced about $6.00 a ton of pulp or approximately $3.00 per cord of wood.

These regional differences indicate plainly that competitive alignments depend almost entirely upon delivered wood costs. The reductions necessary to permit a national balance range between $6.00 and $9.00 per cord in the Northeast and $6.00 per cord in the Lake States. The costs of pulpwood in the Northeast and the Lake States are out of line because of the concentration in these regions during the time when spruce pulps were demanded and before foreign competition became so overpowering in its quantities. With new regions supplying substituting pulps and with a million and a half tons of spruce pulps being drawn from other countries, the heavy demand upon the domestic spruce forests has suddenly decreased. Today forest owners must accept far less for their pulpwood. Today's ruling prices are 40 per cent lower than last year's figures.

In New England and the Middle Atlantic States, particularly in the latter, transportation from the woods to the mill constitutes a large element in wood costs. The average is about $3.50 per cord in New England, but it exceeds $7.00 in the Middle Atlantic States. The latter is high because of the large proportion of imported wood which carries freight charges from $8.00 to $13.00 per cord. It is plain that those mills which are depending upon long distance rail-shipped wood are in a serious position and are probably faced with the prospect of closing down if their quality requirements can be met with purchased pulp.

Yet in these regions there are numerous mills which have as low average pulpwood transportation costs as those in the new regions. Their total pulpwood costs, however, may be high and that is largely because of high stumpage values. To meet the competition these mills must take a tremendous loss in their stumpage accounts. If this is taken and if the high cost mills do go out of operation there is no reason to expect that the forest owning Eastern and Lake States mill may not continue to operate.

On the other hand, in the newer regions wood costs are probably at or at least near their lowest point at the present time. In the West the reduced lumber demand has resulted in a glutted hemlock log market. Logs are sold at and in many cases far below actual money outlay in getting them into tide-water. Such a condition cannot, of course, continue, although there are no immediate prospects of increased log prices. It is obvious that at present prices there is no stumpage realization in hemlock operations.

In the South a number of conditions affect wood prices. Practically none of the Southern mills have been in operation for a long period and all have found almost no competition from other industries or mills for their pulpwood supplies. During recent years the returns from southern agriculture have been meager. The farmer has been in the position of being forced to sacrifice whatever resources he possessed to obtain cash. He has welcomed the opportunity to sell pulpwood. But the available farm supply within truck or team haul of the mill is great and the competition of the farmers has resulted in low prices. This is also a temporary condition; it can be terminated by a rise in farm incomes or by the depletion of the nearby farmer's pulpwood supply.

But increases in wood costs in the new regions may be a matter of relatively slow development. Wood cost decreases in the older regions to permit competition, however, are immediate. The deflation of values and costs in the older regions is extremely drastic, probably more so than need be. The present readjustment tends to penalize temporarily many producers in the older regions; it may force many of them out of business unnecessarily.

In so far as wood costs dominate pulp cost spreads the job of the technical man and the woodlands manager is chiefly to procure wood under conditions of abnormal, intense competition and to use it subsequently to derive the highest possible value. It is plain that both must know the facts. Chiefly, they must be able to determine whether their mill should shut down its pulp mill or whether its fundamental position is sufficiently sound to warrant continued operation at a loss until pulp prices strengthen to a point where it can compete. There is obvious need in the industry for the establishment of reporting systems to permit current analysis of the costs of manufacturing pulp in order that all may be thoroughly informed.

The Effect Of Kinds And Qualities Of Pulpwood Upon Pulp Quality*

By Otto Kress, Tech. Dir., Institute of Paper Chemistry

Within the past twenty years there has been a very decided change in the kinds and total cordage of wood and in the relative amounts of the various species used in the United States for reduction by the various processes of pulping.

In 1910, the pulp industry ordinarily considered that the long-fibred non-resinous woods, such as the spruces and the firs, were the only woods suitable for reduction by the mechanical process, that the long-fibred resinous or non-resinous woods were the only woods suitable for reduction by the sulphate process, and that only the deciduous or so-called short-fibred hard woods were suitable for reduction by the soda process.

In 1930, however, we find that many species which twenty years ago were reduced by one process have now, through necessity, been found applicable to reduction by one of the other processes. This change has been occasioned in a large part by the cutting out of certain species in certain pulp making localities, necessitating the substitution of another species heretofore considered unsuitable for reduction to pulp.

Consumption by Species

Table I indicates the pulpwood consumption by species for the years 1910 and 1930, and shows a total increase of 3,061,282 cords in 1930 over the 1910 figures, or an increase in consumption of 75 per cent.

TABLE I
WOOD CONSUMED IN THE MANUFACTURE OF WOOD PULP

Year	Kind of Wood		Quantity Cords	Distribution Per Cent
1910	Spruce	Domestic	1,473,542	36.0
		Imported	902,407	22.0
	Hemlock		610,478	14.9
	Poplar	Domestic	315,717	7.7
		Imported	45,359	1.1
	Balsam Fir		132,362	3.2
	Pine		105,882	2.6
	Beech		44,265	1.1
	Cottonwood		31,099	0.8
	White Fir		30,845	0.8
	Slab Wood and Other Mill Waste		262,637	6.4
	All Other Species		139,713	3.4
	Total		4,094,306	
1930	Spruce	Domestic	1,842,251	25.7
		Imported	888,255	12.4
	Hemlock		1,185,711	16.6
	Yellow Pine (Southern)		997,195	14.0
	Poplar	Domestic	301,897	4.2
		Imported	159,092	2.2
	Balsam Fir	Domestic	358,461	5.0
		Imported	48,935	0.7
	Jack Pine		248,072	3.4
	Chestnut	Domestic	156,299	2.2
	Yellow Poplar	Domestic	97,795	1.4
	Beech, Birch and Maple		68,848	1.0
	White Fir	Domestic	62,739	0.9
	Gum	Domestic	41,825	0.6
	Tamarack (Larch)		40,054	0.6
	Other Wood		64,057	0.9
	Slabs and Mill Waste		594,102	8.3
	Total		7,155,588	

Spruce the Ideal Wood

Spruce, which is the ideal wood for the manufacture of mechanical, sulphite and kraft pulp, shows an increase in use of only 354,557 cords, or an increase of 15.2 per cent over the 1910 consumption. This relatively slight increase can be explained by the fact that there has been a substitution of other species for spruce in the manufacture chiefly of sulphite pulp, occasioned by the increasing cost of spruce from the standpoint of stumpage and freight haul. As might be expected, balsam fir consumption increased from a total of 132,362 cords in 1910 to a total of 407,396 cords in 1930, or an increase of 200 per cent, which can be attributed largely to the use of balsam in place of spruce in the manufacture of mechanical and sulphite pulps. While spruce would be preferred for the manufacture of long-fibred pulp, balsam fir is being used in ever-increasing amounts, in spite of its pitch content and its susceptibility to decay during protracted storage.

Tremendous Increase in Hemlock

Hemlock wood, which twenty years ago was not considered as a competitor with spruce for the manufacture of high grade bleached sulphite pulp, shows the tremendous increase in consumption of 575,233 cords over the 1910 figures. This increase is accounted for to a large extent by the use of hemlock in the Lake States region for the production of bleached sulphite pulp and the development of the bleached sulphite industry on the Pacific Coast, where western hemlock is the raw material.

Jack Pine for Kraft

The use of jack pine for kraft or sulphate pulp manufacture is decidedly on the increase, as no pitch trouble is experienced and the pulp produced is a fine-fibred stock of excellent strength. It is interesting to note that in the 1910 census the yellow pines were not listed separately but were included under the general heading of pines, with a total consumption of 105,882 cords. In 1930, there is reported a consumption of 997,195 cords of southern yellow pine, practically all of which was converted into kraft pulp,—an industry which has been built up in the South only within the past few years.

The Use of Slabs

The use of slabs, while showing in 1930 a consumption of but 594,102 cords, or an increase of 331,465 over the 1910 consumption, will undoubtedly increase in such localities where the lumber and saw mill operations are reasonably close to an established pulp mill, so that the suitable wood now going to the edge burner can be picked directly from the conveyor and converted into chips for transportation to the pulp mill by barge or car or conveying system.

The increase in consumption of deciduous woods, while appreciable, does not compare with the increase of long-fibred or soft woods, as the short-fibred woods are usually reduced by the soda process or a modified kraft process, and the tonnage increase in this kind of pulp for use in the manufacture of book paper or as a filler pulp has not been as marked as the development in the other pulping processes.

* Delivered at the joint meeting of the Fibrous Materials Committee of the Technical Association of the Pulp and Paper Industry and the Pulpwood Department of the American Paper and Pulp Association, New York, Feb. 15, 1932.

Substitution of Species

From the above figures, it can be seen that in a period of twenty years the pulping industry has increased decidedly in respect to cordage consumption and pulp production as a result of the expansion of the industry; moreover, a very definite substitution of species of wood has occurred, caused undoubtedly by the scarcity of certain woods and correspondingly higher prices for these wood species in certain pulp making localities. Furthermore, the introduction of new species for pulping purposes has come about largely through the regional shift of the industry to new localities and the changes which have occurred in various processes of pulping to permit the use of species which were formerly considered unsuitable for pulping.

A Few of the Changes

To indicate but briefly a few of these changes. We find that in 1930 only 145,401 tons of steamed groundwood were produced, and it is quite probable that the tonnage production of this kind of pulp will tend rather to decrease than to increase. We find that in 1930, there were produced 30,213 tons of semi-chemical pulp, or .65 per cent of the total pulp production, and while this process of pulping is comparatively recent from an operating standpoint, its use may very possibly show a decided increase within the next few years. Other processes of pulping not yet fully developed may within the coming ten years be used on a larger scale, with a consequent increase in consumption of certain wood species. The manufacture of bleached hemlock sulphite pulp from western hemlock on the Pacific Coast and the conversion of yellow pines to kraft pulp in the South are but indications of the regional shift of our industry which has occurred during the past few years and which is somewhat similar in cause and effect to the shift of the news print industry to Canada.

Economic Conditions a Factor

Furthermore, the use to a limited extent of certain species for pulp reduction by processes not ordinarily considered especially suitable for the same is brought about by economic conditions, such as the need for a limited amount of pulp which is not being produced in a given locality. For example, in the Lake States region, where there are no established soda mills, we have some poplar wood being reduced by the sulphite process where the paper mill requires a short-fibered bleached filler pulp and finds it cheaper to make this relatively small amount of pulp rather than to purchase the same on a long freight haul. The reduction of jack pine by the sulphite and soda processes, the possible use of slash pine for sulphite and mechanical pulps and the use of Douglas fir for sulphate and possibly sulphite pulps are but a few of the examples of the substitution of species which may be occasioned by a scarcity and consequent high price of wood in certain pulp localities and by the desire to use cheaper woods in localities where other pulp making considerations (such as wood growth) and economic conditions (such as power, labor, transportation and the like) are favorable for the development of a balanced pulp and paper mill unit.

Walter Metcalf Resigns

Walter E. Metcalf, who has been Superintendent of the Moore & Thompson Paper Company, Bellows Falls, Vt., for the past five years has resigned his position with this concern.

Mr. Metcalf is considered one of the best kraft papermakers in the North.

Distribution of Pulp Sales 1929

The total value of products reported in 1929 by the 198 manufacturing plants engaged primarily in making pulp from wood or other fiber was $238,928,000. Of this amount, only $52,136,000 worth was sold, the other $186,792,000 being transferred to other plants of the same company. (This value of interplant transfers is $3,536,000 greater than that shown in the Census of Manufactures report. The difference is due to the fact that some shipments of products other than wood pulp to controlled plants were treated as interplant transfers in this report.)

SUMMARY—DISTRIBUTION OF SALES, 1929, OF THE MANUFACTURING PLANTS IN THE PULP INDUSTRY (WOOD AND OTHER FIBER)

	Selling value (f.o.b. factory)	Per cent of sales	Number of plants: Total	Number of plants: Selling exclusively as indicated
Total sales	[1] $52,136,000	100.0%	[2] 83	..
Sales to dealers	290,000	0.6%	11	9
Sales to industrial consumers (manufacturers of paper and paper products, publishers, etc.)	51,846,000	99.4%	74	72
Total sales	$52,136,000	100.0%	[2] 83	..
Sales made through manufacturers agents, selling agents, brokers, or commission houses	10,009,000	19.2%	14	5
Sales direct to dealers or consumers	42,127,000	80.8%	78	69

[1] This figure includes the sale of $663,000 of products other than wood pulp made by the plants, such as conduit pipe and cores, tannic acid, turpentine, wood flour, etc.

[2] The total number of manufacturing plants engaged primarily in the manufacture of pulp (wood and other fiber) is 198. Of these, 115 transferred their entire output to other plants of the same company. Inasmuch as some of the other 83 plants sold in more than one way, this figure is less than the total of the figures shown below it.

Nearly all of the sales by the plants were made to industrial consumers, such as manufacturers of paper and paper products, publishers, etc. Data collected for the Census of Distribution show that of the total sales, amounting to $52,136,000, 99.4 per cent, or $51,846,000, was sold in this way. The other 0.6 per cent, or $290,000, was sold to dealers.

Of the total sales, 19.2 per cent, or $10,009,000 worth, was made through manufacturers' agents, selling agents, brokers, or commission houses, $42,127,000 worth of goods being sold direct to consumers or dealers.

There are 198 manufacturing plants engaged primarily in making wood (mechanical and chemical) and other pulp, or wood flour. Of these 198 plants, 115 consume or transfer their entire output to other plants of the same company. This report shows the sales channels used by the 83 plants which sell all or a part of their production.

A Census of Manufactures final report, giving statistics on production, wages, wage earners, etc., for this industry has been issued by the Census Bureau.

W. V. Williams Joins Howard Paper Co.

W. Verne Williams, well known executive in the paper industry, has joined the Howard Paper Company and its associated mills. In addition to his work on Howard Bond, Mr. Williams will also represent The Maxwell Paper Company, Franklin, Ohio, and The Aetna Paper Company, Dayton, Ohio, units of the Howard organization.

Maxwell Offset, Maxwell Bond and Maxwell Bonkote are the products of the Maxwell mill, while the Aetna Paper Company produces Correct Bond—a high grade rag bond paper. For the past twenty years Mr. Williams has been associated with the Bockett Paper Company, Hamilton, Ohio. He was vice president and general manager of this company at the time of his recent resignation.

Paper Manufacturers Meet in New York

American Paper and Pulp Association Holds its Fifty-fifth Annual Convention at the Hotel Pennsylvania—President Willson States That the Industry in the Past Two Years Has Faced New Experiences Which the Association Has Endeavored To Meet

THE Fifty-Fifth Annual Meeting of the American Paper and Pulp Association, which was held at the Hotel Pennsylvania, New York, on Thursday, proved one of the most vitally important gatherings in the history of the association and attracted a fairly satisfactory attendance. President S. L. Willson called the meeting to order at 10.50 a.m. The minutes of the Fifty-Fourth Annual Meeting were approved without reading.

During the meeting the following Amendment to the Constitution was adopted:

"It shall be the duty of the Nominating Committee of the National Paper Council to place in nomination at the annual meeting at which an election is to be held, the names agreed upon by the National Paper Council for all elective officers. Other nominations may be made from the floor by any member when properly seconded.

George W. Sesson, Jr., president of the Racquette River Paper Company, Potsdam, N. Y., introduced the following resolution:

"Whereas American industry is faced with intricate problems of international finance which influence not only domestic production, but particularly the social and economic institutions dependent thereon and also import and export commerce, and

"Whereas proposed solutions of these problems appear to vary in their possible effect on varying industries and on groups within a single industry,

"Be it resolved that the American Paper and Pulp Association express its full sympathy and accord with efforts under way to correct the deplorable situation in American industry resulting from the present dislocation in international finance and urges participation and support by our industry in such studies and such effective legislative action as will assist in the restoration of stability to American industry."

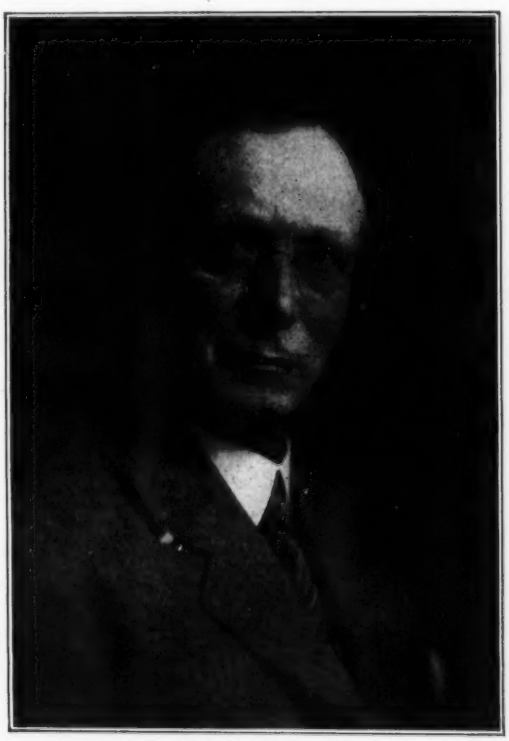
After some discussion, the above resolution was put to the vote and was defeated.

In his annual address, Mr. Willson analyzed the organization of the American Paper and Pulp Association and its relation to the industry. He declared that while the organization had done constructive work, it had by no means accomplished all that was hoped for. This condition had resulted from lack of means and not because of lack of effort. "In our efforts to build a strong house for the paper industry we have faced many difficulties, the principal one being the absence of that factor, which, during the business depression, has affected most of us—that of money, or finances," declared Mr. Willson.

With sales in 1930 off about 25 per cent, the greater effects of the depression began to be felt and the income of the association was naturally reduced. To meet this new financial condition, cuts in salaries, reduction in forces and elimination of other expenses were effected. Mr. Willson announced that the income for the ensuing year will further be reduced, because of lower sales in 1931 than in 1930 and in addition to this automatic reduction in income, some resignations resulting from economic or other reasons will bring about a further reduction of funds.

Mr. Willson expressed the opinion that it will be necessary during the forthcoming year to provide in some manner for the association's requirements, either by the elimination of some of the personnel or some of the present activities, or by an increase in the rate of assessment, so that the gross amount received shall be at least equal to the returns based on the sales in 1929, or by an independent assessment to cover present deficits, leaving the rates for dues the same as at present.

He mentioned the fact that the officers and the executive committee have been and are aware of the seriousness of the situation and have recently authorized an investigation of the association expenses and its activities for the purpose of determining the best course to pursue to meet the present emergencies and to lay the foundation for a larger and more effective organization. He stated that it was the opinion of the executive committee that considerable savings can be effected without the elimination of the present services now furnished and that a budget of expense can be established which will not exceed the anticipated income.



S. L. WILLSON, PRESIDENT

"The organization can be made to function more effectively," said President Willson. "There are important branches of the industry that are not adequately represented, either directly or indirectly, in the association activities. In some manner affiliation must be brought about. We shall also endeavor to sell the benefits of a parent organization to many who in the past, have been indifferent to them, but we shall need the moral and financial support of our present members to bring this about."

During the past two years,

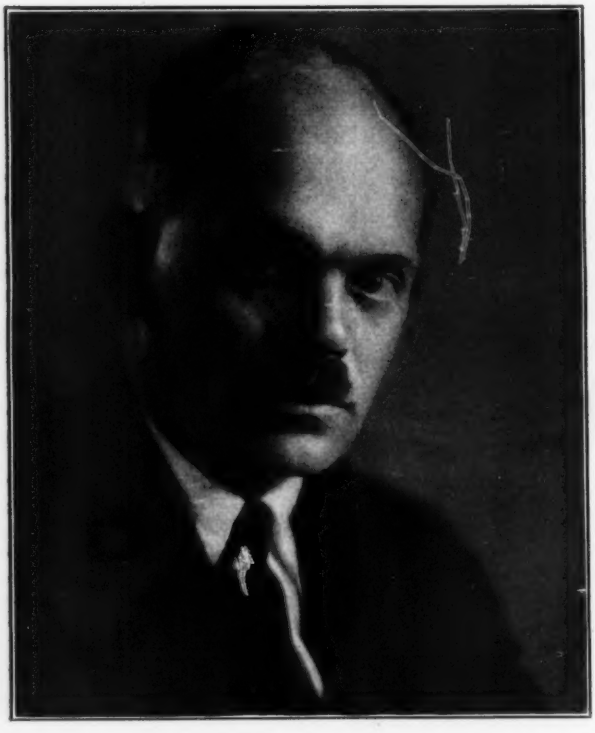
commented Mr. Willson, the paper industry has faced new experiences, upon a much larger scale because of its rapid growth. It has been more scientific in its operations, had more technical control and the necessity of research work and the application of research work is more appreciated. He also referred to the fact that during this period there has been established the Institute of Paper Chemistry at Appleton, Wis., an institution which the industry has badly needed, and which gives promise of much benefit. It is an educational institution for the development of men, giving them post graduate teaching confined exclusively to the problems of pulp and paper. This institute, in the opinion of Mr. Willson, is entitled to the endorsement and support of the entire industry.

Referring to a matter that has caused much discussion during Paper Week, Mr. Willson declared that the association has not taken any action in regard to the compensating clause or added duty to offset the depreciation in foreign exchange on prices of imported goods from countries which have gone off the Gold Standard, because of conflicting viewpoints and interest of the members of the association on this question. "Had the present exchange conditions prevailed at the time the last tariff act was in formation," continued Mr. Wilson, "I am sure there would have been a united effort to protect our domestic commodities and to have tariff rates based upon these conditions, and as it is, not only the paper industry, but industries of all kinds that are and will be affected. It is a problem that should be considered from a national standpoint rather than upon its effects upon any part of our own industry. The measure is protection to labor, prices and commodities, and in my opinion has merit."

The following officers have still another term to serve and the next election will not take place until 1933:

President, S. L. Willson, American Writing Paper Company, Inc.; Vice-President, George H. Mead, The Mead Corporation; Vice-President, W. L. Carter, Nashua Gummed and Coated Paper Company.

Executive Committee: George W. Houk, Hawley Pulp and Paper Company; D. C. Everest, Marathon Paper Mills Company; Henry D. Schmidt, Schmidt & Ault Paper Company; A. R. Graustein, International Paper Company; Norman W. Wilson, Hammermill Paper Company, and David Luke, Jr., West Virginia Pulp and Paper Company.



CHARLES W. BOYCE, SECRETARY

The Banquet

Convention week, as usual, was featured by innumerable festivities, including banquets, luncheons and breakfast meetings. The week concluded with the Fifty-Fifth Annual Banquet of the American Paper and Pulp Association. In addition to this event successful luncheons were held by the National Paper Trade Association, the Salesmen's Association of the Paper Industry, the Technical Association of the Paper Industry, the Paper Bag Manufacturers, American Waxed Paper Association, Cost Department of the American Paper and Pulp Association, Empire State Forest Products Association, Binders Board Manufacturers Association, Paper Makers Advertising Club, and others.

Approximately five hundred members and guests of the American Paper and Pulp Association assembled in the Grand Ballroom of the Hotel Pennsylvania, New York, on Thursday evening. Although the attendance was smaller than usual, it was considered highly satisfactory considering prevailing conditions, and what the audience lacked in numbers it made up for in enthusiasm.

After an excellent repast, S. L. Willson, president of the association, who was the toastmaster, reviewed commercial conditions, at home and abroad, in an able and concise manner. He expressed the view that confidence would shortly displace fear and that the future outlook was hopeful. Mr. Willson's remarks were received with enthusiasm. He said in part:

"We may call this our worst depression, but actually we have progressed far since the days of 1893. In that year and the next, Federal troops were called out in 167 different instances to quell riots and civil commotions; the National Guard of many states was constantly under arms. Today we are practically free from serious civil disturbance and strikes. The diffusion of education among our people has brought with it logical reasoning. Even though they still stampede in fear, they now realize that no particular individual is at fault for our difficulties and that nothing can be gained by force. Far from wanting radical changes in our system, they know that it is the only one which offers them opportunity and they therefore regard present inconveniences and hardships as temporary only. For the American people to lower their standards of living permanently is unthinkable. They will do without only so long as they feel it absolutely impossible to buy. Americans do not accept any condition in life as static either for themselves or their children. Their wants are never filled and they have instilled the Old World with the same desires. Europeans no longer struggle for political abstractions like freedom, equality, and fraternity, but for the material things of life, striving for the American standard of living. Human wants and desires are increasing, not receding.

"It is said that our industrial system is overexpanded, that agricultural and manufacturing production are far beyond the requirements of demand. This has been repeated during all depressions of the last two hundred years only to be refuted by rising events just when the conviction became universal that it was true. How can we say there is too much of anything at a time when

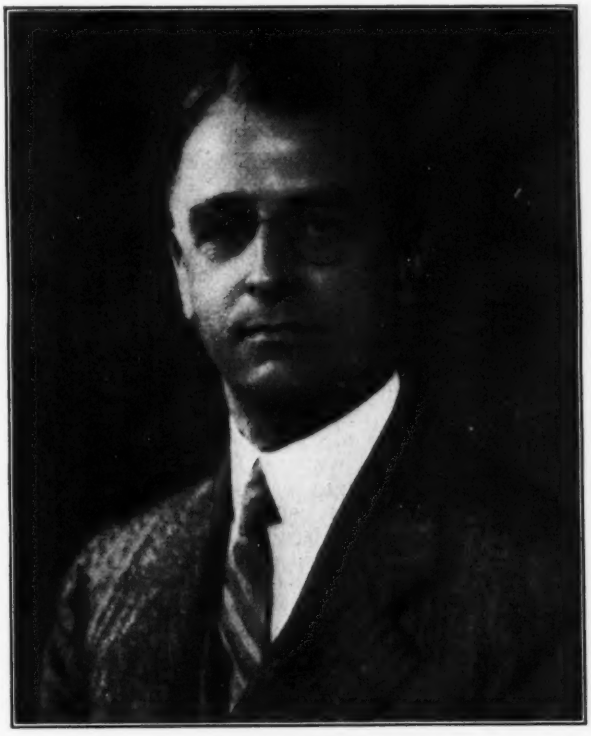
many millions have nothing, when other millions have less than they need and nobody thinks he has enough? Civilization is said to be failing when actually it is not yet a completed machine. Man has perfected those parts of it which produce and transport, but he has given little thought to the distributing mechanism. Can we believe that the genius which has devised methods for producing things in any quantity and carrying them everywhere, will fail to perfect a system which will place them in the hands of all who need and want them?

"Our present system for placing producers' goods in the hands of consumers is based on money and credit. Actually, business is transacted on the basis of 10 per cent by the use of money and 90 per cent through the exchange of credit. Credit in turn is founded mainly on confidence in the future. Thus a period of confidence leads to the expansion of credit and the increased satisfaction of consumers' desires. This is inflation, a word commonly considered evil. The mere expansion of credit, however, is not in itself evil and true inflation consists in the expansion of credit beyond the normal requirements of the moment. In the creation of human misery, it cannot be compared with its antithesis—deflation—as our experience of the last two years will witness.

"Credit, being based on confidence, is destroyed by fear, causing the destruction of buying power and trade which in turn promotes further loss of confidence and so on in a vicious circle. This represents deflation and palpably of its own momentum it can gain sufficient force to destroy all intangible assets if not checked. Even those who furthered deflation directly or indirectly by inspiring the fear which swept it onward, stand aghast at the results. So we now find Congress engaged in many measures designed to check its further havoc. Though these proposals may avoid the inference that they are designed to promote inflation, actually if they accomplish anything at all, inflation is what they will produce, though not in its true sense necessarily.

"The economic world is a world of motion; it never stands still and its credit life blood must flow, if not in one direction then in another. Hence, if deflation ceases, inflation must follow. The question is *not* whether we shall have inflation but will it work? If it works and it always has, it will mean gradual increase in buying power and consumption of goods on hand. This will be followed by the need for further production, giving increased employment and more buyers. In the knowledge that this is occurring, confidence will displace fear. The seeds for this change have already been sown and no matter what the language used, this will be the result. In the meantime thought is being expended to perfect this system upon which the distribution of the world's goods to the masses depends. Perfections essentially will involve a more even distribution of the world's wealth in tokens of money and credit among the people as a whole, and the Reconstruction Finance Corporation and other media will bring this to pass.

"America, unconscious of its position as the leading world power, will show the way. From force of habit acquired over the centuries, she may look to the Old World for guidance in and out of trouble but really this is another time in her history when her own actions are not only of prior importance to herself but to the world at large. America's example will be followed, even though her leadership may not be acknowledged in words. The instinct of the herd is to follow a leader and the instinct of the herd selects its strongest and most intelligent for that post. America fills that role and within her powerful frame is gathering the energy necessary to pull herself and others out the slough and onto the road to progress and prosperity."



JESSE H. NEIL, GENERAL MANAGER

Dr. Henry M. Wriston, president of Lawrence College, Appleton, Wis., and a director of the Institute of Paper Chemistry gave an inspiring and impassioned address on "The Temper of the Modern College," while the proceedings were terminated with a humorous and scintillating talk by Strickland Gilligan.

The Pulp Situation

Folke Becker, of the Rhinelander Paper Company spoke as follows on the "Pulp Situation" at the meeting of the Ward Pulp manufacturers sponsored by the Pulpwood Department of the American Paper and Pulp Association:

It is tempting to spend a little time musing on the questions that the general economic depression suggest. Here is a nation of a hundred and twenty millions, untouched by war, unharmed by any great disaster, possessed of all or more than all of the real wealth and resources that it had two years and a half ago. Things were not perfect then but it can't be denied that there was an air of prosperity and content, even if it was surcharged a little with hysteria. Now we seem to experience a sort of morbid satisfaction in wallowing in a veritable morass of discouragement. Our leaders are exhorting us to be brave, to fight off despair as if we were engaged in a desperate campaign against a powerful and implacable enemy bent on destroying us. Why this loss of faith in ourselves and confidence in the future?

Practical business men anxious to get their plants into profitable operation cannot afford to spend much time in speculating on remote causes but if we are going to get anywhere in correcting this unpleasant condition, do anything more than merely stagnate until something turns up or a lot of us are turned under, we must do a little thinking about the situation.

We all have a pretty good idea of the importance of co-operation. Our customs, rules of conduct and business associations are evidence of the part cooperation plays. In a broad sense as citizens of this Republic, we all cooperate with each other though our opinions may differ very radically on politics, religion, social and international relations, etc. We all pay taxes to support the government, observe numerous laws and regulations, accept money that we have cooperatively agreed shall be a medium of exchange in lieu of actual goods and do many other things that we find to be for the mutual benefit of all of us. We could not live as civilized human beings without cooperation. More than that, experience teaches us that we are all pretty well hooked up together for good or ill. Certainly if we have learned anything from this depression, it is that failure and adversity seem to be just as contagious, just as capable of spreading their devastating effects as success and prosperity.

Recognizing this, it does not behoove any of us regardless of how pleasantly we may, for the moment, be situated to sit back, refuse to cooperate and fancy ourselves secure in the belief that contamination won't reach us. Those who are willing to let the Devil take the hindmost often find themselves in that gentleman's clutches. I do not think that we as paper and pulp manufacturers do cooperate as fully and effectively as we could for the benefit of ourselves and the rest of the country. I do not mean by this that we should necessarily engage in price fixing agreements or subterfuges leading to that end, but I do believe we could well afford to take a little broader gauged view of the matter than we have in the past.

Pulp Manufacturers in the Lake States

To bring it down to cases consider the pulp manufacturer in the Lake States, particularly in Wisconsin, my home. Most, if not all of them have cut wages, salaries and all reducible over-head to the bone. They have slashed the price of pulpwood until it is pretty generally admitted that producers can make little or nothing in disposing of it. Still it is found that now due to the depreciation of the currency in which foreign importers are paid for their pulp that it is possible to buy that product on the seaboard and freight it out there for less money than our cost of manufacture.

That is a demonstrable fact. It can be readily dismissed for the time being by saying that it is too bad that the middle-western mills are so unfavorably located. That would represent the spirit of non-cooperation. If it prevails and it may prevail temporarily, it will mean the closing down of numerous Wisconsin, Minnesota and Michigan plants, it will involve the economic waste incident to idle machinery and equipment, it will put thousands out of work that are employed directly and other thousands that are indirectly engaged in the business. During 1931 in Wisconsin alone, according to the Paper Trade Journal 3674 people were engaged in the industry and the business done amounted to over thirty-six millions. It will naturally entail some hardship for middle west paper manufacturers, of which I am one, who are making their own pulp, Far outweighing those considerations in importance, it will be a mighty bad thing for this country and there isn't an American manufacturer anywhere who can escape the bad effects of it. Some may not feel it at first and others may not recognize it when they do feel it but everyone of them is going to be adversely affected. We cannot keep on throwing American Labor and American Capital out of work and stimulating foreign industry, without having the evils of such a policy come right back home to roost. It will pay all of us well not to forget that.

I hope, more than that, I feel confident that our association which has heretofore met and solved greater difficulties than this, will put itself four-square on record as favorable to equal protection for all branches of the industry. As Americans committed to the general policy of protection, we can do no less than that. We must sink local prejudice, we must raise again Roosevelt's great rallying cry, "The Square Deal," and regardless of immediate considerations, be guided by the lode-star of fundamental principle. More prosperous times are coming. We can hasten their arrival by eschewing thought of temporary advantage, by playing the game together according to the rules and holding the welfare of the country above that of private interest.

General Manager's Report

Jesse H. Neil, general manager of the association presented his report as follows:

In Congress, in state governments, in trade associations, in the Chamber of Commerce of the United States of America, and elsewhere discussions are going on that bring us face to face with facts that we cannot overlook either as an association or as separate companies.

The agitation is aimed at developing a system of national control of business. We are told that industry must learn to govern itself or submit to control by government bureaucracy. It is plainly speaking, no longer a question of control but who is to exercise it. Unless business can demonstrate a capacity for intelligent direction, can put its own house in order, the public interest will force appropriate governmental action, just as it did in the case of the oil producers of Oklahoma and Texas.

A piece of legislation growing out of this situation, is the bill now before the Senate, introduced by Senator La Follette of Wisconsin. It proposes the establishment of a National Economic Council of fifteen members, appointed by the President for terms of four years. It would be the function of this Council to study all matters affecting the economic interests of the country, and present to the President and Congress, its recommendations as to such action as it deems necessary, legislative or otherwise. This body would have the power to compel the attendance of witnesses, the production of documents, and to this end would have the assistance of the Federal Courts.

Since last October, many outstanding authorities have testified before the committee having the bill in charge. It appears likely that the measure will be favorably reported to the Senate at this session.

Last fall, the Chamber of Commerce of the United States of America sent out a referendum to obtain the views of American business on the need for a National Economic Council. The vote was overwhelmingly in its favor. Under their plan, the Council would consist of three to five men to be appointed by representative business interests. The so-called Swope Plan proposed by the head of General Electric would make membership in trade associations compulsory and would endow such bodies with authority to carry out employment stabilization plans, old age pensions, and to control production. There are others of similar purpose.

Significance of Movement

Without entering into any discussion as to the relative merits of these remedies for our economic disorders, it behooves every national industrial organization to inquire thoughtfully into the significance of these movements and the causes back of them. Have we been on the wrong track or have changed conditions made a change of course unavoidable.

In the paper and pulp field as in other industries, we have been operating under a system of free and uncontrolled competition; we have exalted and jealously guarded

the right of private initiative, and the results would seem to furnish convincing evidence of the soundness of this system. No nation in history has approached our accomplishments, and yet on 22 occasions the system suddenly has refused to work. At too frequent intervals maladjustments in our business economy throw the machine out of gear with consequent distress to the whole people, and we have the ironical spectacle of hunger going hand in hand with food surpluses, and we are forced to contemplate the anomaly and the stupidity of suffering produced by superabundant riches.

It is true that the country always has recovered from these periodic recessions and gone on to higher levels of accomplishment, but why should we sit supinely by and endure these afflictions as we do the vagaries of the weather. Are we stoics who derive enjoyment from the flagellations of misfortune, or perhaps desciples of that fatalistic doctrine which counsels unresisting submission to "the slings and arrows of outrageous fortune," because such visitations are preordained and beyond finite powers.

I prefer to believe, and so do you if I do not misjudge your spirit and temper, that human events born of human mistakes or ignorance, are amenable to prevention and cure through the application of human wisdom, intelligence and courage. If this be true, what is to interfere with the initiation of measures by this great industry to work out its own salvation and to align itself with contemporary forces of reconstruction?

Absolutely nothing within my purview, except the apathy of conceded defeat, or blindness to existing trends and conditions.

If we face the facts the conclusion is forced upon us, that rampant individualism must be abandoned and the realization allowed to sink in, that planning for progress, that any effective control of our industrial economy, demand collective thinking and cooperative effort.

When our natural resources were being opened up, the vast reaches of western land being populated, hordes of immigrants flooding in, cities being builded with amazing speed, a business man could back his guesses and his hunches, and influences beyond his control would crown his ventures with success.

Today a business man must recognize that his business is a part of an industry, that his plans must coincide with the industry interests and that the industry must consider the inter-relations of other industries as they affect the national welfare. If we grasp that truth we can obviate the necessity for a public utility status and strangling government control.

Trend of Action

How is all this going to be accomplished? Let us go back to the hearings before the La Follette Committee, before which appeared an imposing list of economists, financiers, labor leaders, and captains of industry. As a result of their testimony and counsel, the following significant paragraph has been written into the Bill which did not appear in the original draft:

"The National Economic Council shall initiate the organization of councils or associations within the various major branches of production, distribution and finance, to consider economic questions affecting their operations.

"The National Economic Council shall consider recommendations submitted by such councils or associations for the adoption of new policies and measures for putting them into effect.

"The Council shall not recognize any such council or association unless it is truly representative of the economic interests within the particular branch of production, distribution, or finance, in which it is organized; and in case any such council or association is not so representative, the National Economic Council shall encourage the reorganization thereof, or the organization of a new council or association for such branch."

One of the many advisors of the La Follette Committee was Henry I. Harriman, a high executive in important New England industries, and Chairman of the able Committee of the Chamber of Commerce of the United States of America, which made a brilliant report on the subject of a National Economic Council. In his testimony he asserted:

"I believe that the trade organizations throughout the country should be very much strengthened. I am not so sure that it would not be wise to have a Federal Law for the incorporation of trade organizations, so that they might all be incorporated under a similar statute.

"I believe that every trade organization should have its own advisory board or economic council which in turn would advise with the National Economic Council."

I submit this evidence, gentlemen, as impressive symptoms of the kind of thinking that is going on in high places; and of the unmistakable trend of public opinion towards plan, order and system in our national economy, as the only means of stabilization. May I remind you that we are not viewing this movement as spectators—every pulp and paper mill in this country is definitely concerned and must take cognizance of it. Everyone in the industry, and I don't care what he makes, has a personal responsibility in this matter which too few have recognized, and the fact that participation is voluntary but emphasizes the obligation. You can't make paper without paper-making machinery, and you can't have national cooperation in the paper industry without adequate cooperative machinery, and *the will to use it.*

Neither can there be the inter-industry relationships contemplated in all of the plans to coordinate the factors of prosperity, without a strong, central organization to represent the whole industry and all of its divisions.

Right after the grand debacle of October, 1929, the remodeling of your national organization machinery was begun; it has continued with remarkable success despite a falling income, drastic measures of retrenchment, and unprecedented problems. From now on however, progress must stop and curtailment set in, unless a larger percentage of the industry realizes the wisdom, yes and the selfish advantage, of united effort to solve our common problems and forestall future disasters.

Problems Common to All

And there *are* problems common to all divisions of the industry and all sections of the country that must be settled in the national interest if they are to stay settled.

Prominent among them are marketing and distribution. Markets create mills, mines, farms, and machinery. A sound distribution system makes or breaks mills, industries and communities. A million dollars in orders can always find a mill and if there is no mill one will be built.

Demand always creates supply. Big, vitally important problems, are they not?

Rapid expansion of paper consumption in the United States has deferred or mitigated the effects of market inequalities and loose methods, but this period of comparatively easy business is nearing the end. Further consumption increases are more likely to conform to population trends, especially in the cultural grades; the lines are being drawn closer, and the industry is settling down to its logical place in the national economy.

You are asking, you need to know, what will be the

effect of these fundamental transitions upon marketing methods. What changes are called for; must the cost of distribution be reduced and if so how. Then there is the competitive situation, intense and too often destructive. All are agreed as to the evil influences of predatory or ignorant competition that seeks an immediate selfish advantage without regard to its ultimate effect upon the stability of the group or the industry. The effect of such disturbances reaches back to raw materials forcing wage cuts, and disrupts the stabilized operations of distantly related groups through irresponsible grade shifting.

Single mills are helpless to apply remedies. The solution depends upon cooperation for self education in groups and in the industry as a whole, with the aid of the trained association specialists available.

Meeting Raw Material Situation

At the other end of the industry is a seriously muddled raw material situation. Companies which have built up forest reserves to supply their wood pulp needs, are caught with high forest values and expensive pulpwood stocks in an international and inter-species competition, which have carried pulp prices far below manufacturing costs, even in the lowest cost regions. Many mills are closed down; other mills which have forest-mill organizations sufficient in times of normal competition, are threatened. Still other mills which cannot obtain wood at comparable costs, are carrying on blindly in the hope that values may be restored, wasting their cash resources in what may be a vain struggle.

What are the FACTS, you ask? Will values be restored or must stumpage accounts undergo stern deflation? Is it wise for a mill to shift to other materials or to wood pulp from other sources? These and other questions need the combined intelligence of the industry in united, associated effort to ascertain the facts and the most likely possibilities. They demand too, well considered public cooperation for public values are at stake. No insolvent industry can meet its forest land obligations, nor can it support public expenditures built upon its tax returns.

This is but one phase of the raw material situation; it embraces also, study and research into world conditions on pulp, wood, and supplementary materials. Knowledge of these facts, their interpretation and application, are at the foundation of any plan to perpetuate the industry on a profitable, stable basis. It's a common problem, demanding common action through a common agency.

In costs, to add another instance, despite steady progress, there is much to be done, both in the way of self improvement and self protection. Prices and costs in some companies scarcely have a bowing acquaintance. Too few are able to relate costs to prices on individual items. Conflicting and unsound ideas on cost still prevail. Decent competition, assured profits and the integrity of capital, still wait upon cost education, and the acceptance of sound uniform, accounting principles.

Then there are the related problems of over-investment, over-expansion and over-production. Any system of national economic direction that may be evolved would demand of each industry the fullest facilities for the study and handling of these vital questions; questions which are linked and meshed with the happiness and prosperity of the whole population.

Collective Planning on Industry Basis

Any complete or partial remedy that may be found, must come as a result of collective planning and action on an industry wide basis. Paper products are inter-related as to raw materials, and the possibilities of shifting from one grade to another, create a definite community of interest by all kinds of mills in all sections. Whatever is done must be done from a national viewpoint in the national interest.

The accomplishments of your national association in this direction are promising in nature and substantial in results. During 1930 and in a lesser degree in 1931, a number of unwise and unnecessary projects for building new mills were abandoned, because there we had a central source of factual data.

This work must be carried on and expanded to meet the requirements but its development will be proportional to the wisdom, public spirit, and enlightened selfishness to be found in our industry. The industry may progress and grow in an orderly, rational, profitable way, or its future course may be motivated by guess-work, whim, fancy, and the need or greed of promoters and exploiters.

The big point in this connection is, that the paper industry has the power to CHOOSE which road it shall follow, but it cannot choose the road leading to stability and refuse to furnish the means of transportation. I can only propound the question—you only can supply the answer.

We might go on at length to enumerate other major problems that overlie our pulp and paper industry and that never can be cleared from our path except through mobilized thinking and concerted action made effective by a strong national organization. In touching upon a few examples for purposes of illustration, I do not want to divert attention from the creditable current achievements of your Association which have amply justified the loyal support and generous cooperation of the best men in the industry for a long term of years. You have that information from the regular reports and bulletins.

Members Deserve Praise

Neither do I desire even to appear to offer admonishment or counsel to this clear-visioned, public-spirited group of old members whose allegiance to your national organization has been unshaken through storm or fair weather. Many of these old stalwarts represent companies which participated in the founding of the Association in 1878. The non-participating element of the industry especially, owe these men a real debt of gratitude.

One regiment of shock troops will not suffice however, in the face of present day conditions. Public opinion, the necessities of the country, the compelling trend of events, our own difficulties, all call for industry-wide cooperation. We must meet the situation as an army, not as scattered detachments and uncoordinated fragments. And if industry does not meet it voluntarily, it may be drafted into service under conditions not wholly agreeable.

Shall we not rather join heartily in an effort to vitalize and expand our national association, put our own house in order, and be prepared to interchange cooperation with other industries through a National Economic Council in the interest of planned prosperity for ourselves and the United States?

Engineering Department

C. M. Baker, engineer, reported as follows for the Engineering Department:—

Slime control research, the major activity of the Engineering Department during the past year, has developed a much more effective method of handling this difficult and troublesome problem. Complaints regarding pollution from the pulp and paper industry have been somewhat less, possibly due to the reduced operation, although it is believed that the generally accepted fact that the pulp and paper industry is making an earnest effort to solve its pollution

problem, is creating a more tolerant attitude on the part of the public. Stream pollution legislation, however, is being considered in two or three states. Individual mills have been assisted in their white water problems and in developing improved water supplies.

Slime Control

Slime control has been one of the principal barriers in developing complete white water utilization. While chlorination has been relatively effective in a number of mills rapid dissipation of the chemical in its combination with organic matter has reduced its efficiency and complicated the problem with more complete closing of the white water systems. Recent developments in the use of the ammonia-chlorine treatment in the purification of public water supplies led to research regarding application of this method of sterilization to the pulp and paper mills.

Careful bacteriologically controlled tests were conducted in two mills; data regarding experiences in other mills were gathered; the cooperation and assistance of various experts were secured, and a careful study made of available literature. Briefly stated the conclusions of this investigation were as follows:

(a) Ammonia-chlorine treatment of the raw water supply has largely corrected objectionable slime conditions in the white water system where chlorine alone proved ineffective even when applied at several points through the system.

(b) The use of ammonia with chlorine materially decreased the number of bacteria in the white water system.

(c) With decreased bacterial counts slime conditions have improved.

(d) With the ammonia-chlorine treatment there is less tendency to corrosion and less complaints regarding interferences with color.

"Slime Control", a special bulletin published by the American Paper & Pulp Association, discusses this work in detail.

State Activities

At the time of the 1930 annual convention of the Association, a mill in Virginia called upon the Engineer to assist it in a problem of threatened litigation regarding the effect of pollution from its wastes upon a public water supply. A controversy had arisen which was the subject of editorial comment and much publicity in the local papers. An attitude very antagonistic to industry was being developed.

The Engineer of the Association visited the mill, conferred with state, municipal, and mill officials and after several days' conferences and activities was able to develop a program which has proven satisfactory to all concerned. The editor of the local paper, who conducted an active and aggressive campaign against the industry has since expressed his entire satisfaction regarding the method adopted and the results obtained.

Assistance has been given local committees of the industry in developing rational legislation where there has been agitation for legislation. While there is some difference of opinion among the industrial groups as to whether industry should adopt or even acquiesce in any legislation, it is believed that the sanctioning of practical legislation fair to industry, will do much to defeat radical legislation and policies. Opposition to all legislation will tend to develop an antagonistic attitude on the part of the public, and may ultimately result in drastic action that could have been prevented.

In March, a petition containing some 600 names, was presented to the Wisconsin Stream Pollution Committee complaining of pollution on the Upper Wisconsin River. A resolution was also passed by the State Legislature demanding a report from the Stream Pollution Committee and tending to discredit the value of the cooperative program of the past two years. As a result of these petitions and activities the Stream Pollution Committee called a hearing at Merrill, Wisconsin, on March 13, 1931.

The Engineer of the Association was called upon to represent the industry in this controversy. He outlined and organized the defense for the industry, attended the hearing and conducted the examination and cross examination of witnesses. The hearing lasted two days.

At this hearing it was brought out that:

1. The pulp and paper industry ranks fourth in the state of Wisconsin, with a capital investment of $130,000,000, an annual value of $121,000,000 in combined paper mill and related products and an annual payroll of $23,400,000.
2. The population in the Upper Wisconsin River Valley are largely dependent for subsistence upon the pulp and paper industry which is the greatest economic asset of the locality.
3. The pulp and paper industry is the only industry conducting a national program to solve its stream pollution problem.
4. The mills of Wisconsin are cooperating in every way possible with the Stream Pollution Committee and other authorities to improve stream conditions.
5. No practical processes are known for utilizing, treating or satisfactorily disposing of certain pulp mill wastes.
6. Climatic and other conditions are important factors in affecting the aquatic life of a stream.
7. Chemical and biological surveys have shown relatively satisfactory conditions in the Upper Wisconsin River.

While no decision has yet been rendered by the Committee, it is believed that the hearing which was given considerable publicity, had a substantial effect upon public opinion. Complaints have been less, and it is believed that the situation is much more satisfactory now than before.

A complete report has been published upon the stream surveys conducted in Maine last year. This indicated that stream conditions were reasonably satisfactory in Maine, and it is understood that no legislation is contemplated at the present time.

Mill Service

Service has been rendered a number of mills in various problems of white water utilization. The outstanding development along this line, as has been stated, is the research in slime control. In several mills substantial financial savings have been made in white water utilization because of suggestions of this department.

A more recent development in mill service which has not been fully appreciated by the industry is advice and consultation in connection with the development of mill water supplies. The Engineer of the Association recently assisted one mill in particular in a very difficult problem. Counsel and advice were given mill officials in the development, design, and letting the contract for a water purification plant guaranteed to deliver water free from turbidity and with not more than 5 parts per million of color, or one-tenth part per million of iron or manganese; a water entirely satisfactory for manufacturing the highest grades of paper. The source of the raw water is a river high in turbidity and color and containing iron and manganese in quantity sufficient to discolor the paper.

This same service is available to all members of the American Paper & Pulp Association.

In addition to maintaining activities already initiated it is believed that future activities should include further research in problems related to white water utilization biological control, foam difficulties, etc.

Simplification and Standardization

The Committee on Simplification and Standardization of the American Paper and Pulp Association and the National Paper Trade Association submitted its annual report as follows:—

In accordance with the resolutions passed by the American Paper and Pulp Association and the National Paper Trade Association, our president appointed a committee to make a further study of the facts pertaining to the 1931 report with the idea of bringing in definite recommendations that would effect a saving on the part of mills and merchants through the standardization of sample book sizes (a simple and uniform filing system, and a method of distribution that would cut down the waste of time and money which now exists through the duplication of mailing lists and dual distribution in many of the larger cities and territories.

The committee appointed by the President of the American Paper and Pulp Association was as follows:

E. S. Dunbar, Crocker-McElwain Company
W. B. Gibson, Dill & Collins Company
Cy Norton, Strathmore Paper Company
Charles B. Peto, Hammermill Paper Company
Frank Taylor, Advertisers Paper Mills
Robert C. Fay, American Writing Paper Company, *Chairman*.

The following committee was appointed by the President of the National Paper Trade Association to cooperate with the committee appointed for the mills.

William H. Rourke, Rourke-Eno Paper Company
Robert C. Fay, American Paper Company, *Chairman*

Standardization of Sample Book Sizes

By referring to page 4 of the 1931 report, it will be seen that size 8½ x 11 was the choice of 632 printers, advertising managers and advertising agencies out of a total of 1293 firms and individuals who answered the questionnaire.

It will also be noted that sizes 6¼ x 9¼ and 5½ x 8½ were the choice of 620 firms and individuals answering the questionnaire.

Your committee, therefore, recommends that all mill sample books and sample books issued by paper merchants (where private brands are sampled), the small size should not be smaller than 5½ x 8½, and not larger than 6¼ x 9¼ and the large size should not be smaller than 8½ x 11 nor larger than 9 x 12.

These recommended sizes are based upon a study of standard letter filing systems. The two smaller sizes can be filed side by side in the regular standard letter file, and the larger sizes will fit these files in the same manner as a regular letter folder.

The adoption of these standard sizes will mean that all merchants will gradually discontinue their individual sample cabinets, bound books and loose-leaf binders as these new standard sizes are recommended with the idea that they will fit ordinary standard letter files as set forth in the following recommendation covering a uniform filing system.

Uniform Filing System

Hundreds of thousands of dollars are being spent each year by paper merchants for wood and steel paper sample cabinets in which to present their lines to printers and advertising customers and prospects.

Each one tried to outdo the other and there is a constant expensive battle for preferred position in the buyer's office, and like the vicious circle of price-cutting, no one makes a profit from the investment. Not one out of ten can be kept up to date by any plan yet devised.

Cabinets are emptied of samples and are used for the storage of plates, paper and junk of all kinds.

The investigation and survey indicate that the ideal system would be for printers, other buyers and specifiers to furnish their own standard letter size filing cabinet and for merchants to cooperate by furnishing them with a complete set of file guides which will fit the regular 8½ x 11 file drawers.

For example, guides will cover such classifications as sulphite bonds, rag bonds, coated book, super book, English finish book, and other general classifications. (See appendix for details).

Merchants will advise their customers effective on an agreed date that all buyers will be asked to maintain in their own establishments a standard four to six drawer filing cabinet for the systematic filing of paper samples furnished by the mills and merchants (in the case of private brands) according to the classifications indicated by the index guides furnished by the merchants collectively.

Your committee will prepare a set of standard guides which will be manufactured by such manufacturers of filing equipment who indicate their desire to cooperate with the two associations in this effort.

An alternate plan which has already proven successful is for the merchants in each city to furnish the best grade printers, buyers and specifiers of paper with a four to six drawer regular standard filing cabinet, each merchant taking one drawer. This plan has been working effectively in Detroit, and the plan is outlined by Mr. Robert Roehm of Beecher, Peck & Lewis Company of Detroit as follows:

"The idea was discussed a couple of years ago. However, at that time, most of the merchants refused to lose their identity by being a part of a consolidated sampling proposition.

"After each and every one had gone through the period of the last two years with an individual expense connected with the issuance of samples and sample cabinets, they were willing and ready to talk about the consolidated cabinet.

"It was agreed at one meeting to proceed with plans to bring this about. In the meantime, a few printers were asked about it and it was so enthusiastically received, that there was no question about its acceptance and success.

"On or about February 1, 1931, the plans were settled and the number of houses operating were established and the whole thing was turned over to the writer to line up the cabinet.

"I handled the whole thing carte-blanche without the least interference even to the placing of the various merchants' names on the cabinets and their locations which, by the way, was done by chance and not by selection.

"After the cabinets were received in Shaw-Walker's Detroit Branch, file folders were placed in them, drawers were lettered, cabinets numbered and other details attended to. A list which had been made up prior to this by the group was given the Shaw-Walker Company and delivery made to the printers.

"As the receipts came in for the cabinets, we notified each of the houses cooperating and they had their samples packed in bundles and delivered them by special messenger who placed them in the cabinet within three or four days after it was delivered.

"Am just giving you a little of the mechanics of the handling of the proposition because it worked so wonderfully well and everything that the writer suggested or did without advice was never questioned.

"When the invoice came in, I simply split it up into the different portions and sent them a bill for it and they

mailed checks to me and we remitted for the entire proposition.

"They, you understand, each furnished their individual printed samples.

"The printers of Detroit, the Typothetae Organization, some of the larger agencies and industrial plants have nothing but praise for the plan. In some places, that is the only cabinet appearing in the office because it is so neat in appearance and so compact. The merchant's samples that are not in this six drawer cabinet are usually found out behind the partition.

"It has been 100% success from every angle and we know it has saved each individual house considerable money as the drawer itself or their portion of the expense plus their samples has been far less than any one individual cabinet and samples contained therein has cost them before.

"One house that had to start from scratch to build the entire sample folders to fit the cabinet, stated that their drawer cost including cabinet and printed folders was around $15.00. Considering the permanency of the cabinet and small replacement cost per folder, you can see that this alone would be a great saving over putting out the old various types of cabinets as has been the habit in the past.

"We had another problem to solve and that was taking care of the smaller printers that were not entitled to the large consolidated cabinet. For these we have had made up about 300 small steel cabinets of special design but of standard size that will hold the entire line or any particular group of papers that the individual account might be interested in. This cabinet has also been placed with the smaller advertising agencies and consumers that specify paper and this works to very good advantage."

After reading the above outline there can be no question as to the economy and efficiency of such a plan, and whenever desirable your committee recommends that the "Detroit Sample Cabinet System" of filing samples be installed by the progressive merchants in each city.

Centralized Mailing Service

To obtain the maximum efficiency from the recommended uniform filing system, your committee believes that a centralized mailing service would effect the greatest saving possible.

The committee realizes that many mills and merchants have built up mailing lists for their own individual use at heavy expenditures of time and money. It is appreciated, of course, that those possessing such lists might be unwilling to scrap or to contribute them; the contribution of lists is not compulsory.

There is no reason to believe, however, that the compilation and maintenance of master lists by this central organization will interfere with the individual lists; rather it would materially assist in their maintenance if desired or provide a substitute at much less cost. This service would function as follows:

1. Both mills and merchants, for the most part, could use to good advantage a list made up of the following classifications. These may be further subdivided if it is found necessary.

A.	Printers (over $5000)	9000
B.	Printers (under $5000)	28000
C.	Printers (private plants)	1800
D.	Lithographers	1500
E.	Advertising Agencies	2400
F.	Advertisers	20000
		62700

2. Many mills or merchants have no facilities for getting together such a list.
3. A Central Mailing Service would be especially economical and efficient in the distribution of mill and merchant advertising.
   - A. It would eliminate costly duplication of advertising pieces, especially where there were more than one paper distributor in that territory.
   - B. It would insure prompt and complete distribution throughout the country at one time or on a pre-arranged schedule.
   - C. It would relieve merchants of the necessity of mailing mill advertising.
     (Of course advance copies of all mill advertising would be furnished for the personal use of the merchants' salesmen).
4. This Central Mailing List could be kept in one place, or it could be divided so that the eastern section of the country would be handled from an eastern city, and the western section from a mid-west city to save parcel post cost. Regardless of where it is kept the list should be kept under the headings outlined in paragraph one, or possibly subdivided further, and filed as follows:
   - A. Each heading would be complete as to state, city and alphabetical listing of the company.
   - B. This would enable the advertiser to make as selective a mailing as he wished.
5. The Central Mailing Service would be under the supervision of the American Paper and Pulp Association or some agent appointed by them.
6. This Central Mailing Service would of necessity be self-supporting.
   - A. A small annual fee could be charged to all mills and to all merchants in sampling private brands desiring to use this list, to pay for its maintenance.
   - B. A fixed fee for addressing, based on the per thousand cost of labor involved in addressing the advertising pieces, would be charged.
   - C. Postage, of course, would be charged to the mill or merchant making the mailing.
   - D. This Central Mailing Service would be available to all mills and merchants, and its use by them at the prescribed fees would imply no obligation either to be members of the Association or to contribute their own mailing lists.

Summary

Your committee wishes to make it clear that these recommendations are not individual opinions, but the result of an extensive survey which demonstrates conclusively the vital need for this program.

1. The standardization of sample book sizes as outlined previously in this report, as this will save a large sum of money for both the mills and the merchants each year.
2. The uniform filing system for the better service of the user, and the elimination of waste which will likewise save money for the merchants and the mills. This would mean a gradual discontinuance of all merchants' sample cabinets and sample books.
3. Following the carrying out of the above recommendation, a centralized mailing service can be gradually put into effect.

Pulpwood Department

Charles W. Boyce, Secretary, reported as follows for the Pulpwood Department:—

Falling pulp prices in 1930, the result of intense international competition that centered in the American market, indicated that more drastic price reductions were to follow.

The indications were correct for prices not only of pulp but of pulpwood as well sunk to levels of fifteen years ago. Deflation was universal throughout the industry; paper price also broke sharply during the year.

World Pulp Survey

The influence of world conditions upon national pulp production and upon prices of both pulp and paper became increasingly evident. Exact knowledge of the far-reaching relationships was not available. To determine and to analyze these relationships, the Pulpwood Department undertook a statistical survey of woodpulp production and export in all producing countries. The survey data were related to the needs of large consuming countries on the one hand and to shifts in types of consumption and to possible increases in production on the other. These data published in "Pulpwood" constitute the first extensive survey of the industry that is printed in English.

The world survey threw light upon the relationships between the American pulp consumer and the foreign producer and it emphasized the character and extent of the competition that domestic producers were encountering to become established in the national markets. Moreover, it showed a serious condition of excess capacity in the world industry, directly caused by the overstimulating effect of rapidly rising American pulp consumption. It was apparent that producers in the various countries were not accurately informed concerning either the increased pulp manufacture or the production possibilities in other countries or regions. Likewise, they possessed no gauge of consumption trends in the pulp importing countries. The survey, in short, disclosed an urgent need for regular world surveys of pulp production, exports and stocks by countries in order that all producers would be better able to guide their production schedules, to maintain volume and price stability, and to undertake capacity expansion only as the need occurred. In cooperation with various agencies, the Association has undertaken the organization of a monthly survey service, to be broadcast to all producers.

Growth of Domestic Industry

As the competition in domestic pulp market increased and as foreign shipments attained higher relationships to past records than domestic production was able to maintain, need was felt for a gauge of the domestic dependence for pulpwood, woodpulp and paper upon outside sources. The ground work for this study had been laid in the United States Department of Agriculture Bulletin No. 1241. It was necessary simply to bring this work up to date. The results, published in "Pulpwood" showed that prior to 1930 a reversal of the trend of foreign dependence had occurred and that the use of domestic pulpwood had begun to increase more rapidly than paper consumption. The reversal of this trend is due to the rapid rise in kraft pulp production in the South and in sulphite pulp manufacture in the West.

Considered in relation to the world survey, this study revealed the tremendous competitive power of American production under normal conditions of competition. Although imports are still moving upward, there is evidence in these analyses that domestic manufacture of sulphate and bleached sulphite grades may become sufficient. The case is not yet clear in unbleached sulphite for in this grade American output has shown no tendency yet to increase despite the possibilities in the West. Mechanical manufacture also shows no present indications of meeting the national need; the possibilities of regional and species shifts to bring about sufficiency exist, but they involve many economic and technical problems which have not yet been solved.

Problems of the Industry

Great as the competitive power of domestic production is, it has, however, fallen before the competition of foreign producers since currencies depreciated in many exporting countries. The conditions surrounding the shift in competitive advantages due solely to currency debasement, have been recently studied by the Department and an impartial analysis of effects has been published in "Pulpwood." It is plain that present foreign competition has created a new set of problems affecting all interests. These and other conditions have brought about an uncertainty as to production schedules and prices. How stability can be restored and fair competitive rights maintained are problems of prime importance.

The far-reaching influences of price reductions are leading to realignment of competitive conditions in the various pulp producing regions in the United States. Of special importance is the shift in pulpwood prices and their effect upon forest values. The intense competition combined with rapid expansion of wood suitability for pulp manufacture, has the effect of diminishing forest values, particularly in the older pulpwood regions. Although this constitutes an immediately heavy loss, it tends to bring about an adjustment of pulpwood use to supply that will eventually assist the older regions in maintaining their positions in the national competition. The character of the readjustments now in progress was discussed in "Pulpwood."

Cooperation with Timber Conservation Board

In addition to the special studies and to the routine services, the Department has cooperated extensively with the Timber Conservation Board, which was appointed by President Hoover in January, 1931 to assist forest products industries in solving their problems. A brief, analyzing the situation in the pulp and paper industry was submitted to the Board; it was published together with other testimony in "Pulpwood." Following this, many of the investigations under Project II were assigned to the Department for analytical study. Among them are included studies of stumpage price trends, of lumber prices and stumpage realizations, of the distribution of forest ownership, of interest and tax charge burdens and their relation to overproduction, of production costs, and of future paper and pulp requirements. The source data for these studies were gathered under the direction of the Department and two of the completed reports have been submitted.

The Department's time for participation in this work was authorized by the Association's Executive Committee to the extent of one week a month; expenses incident to the cooperation were personally donated in behalf of the Association. It is hoped that the remaining reports may be completed in the Association's present fiscal year.

The Department's work during the past year has been along broad lines, largely in the nature of economic analysis of competitive relationships and of world and national trends. This may constitute overemphasis. Perhaps overemphasis has been justified, however, by the turn in conditions toward broader considerations of industry and world movements. In so far as possible, however, next year's work will be directed toward more specific studies or regional and company conditions to strengthen the competitive chances of the industry and to render direct and needed mill services.

The Department has been fortunate in having the cooperation of the other departments of the Association and of the General Manager's staff. Special thanks are given to Mr. R. S. Kellog, Secretary of the News Print Service Bureau and to Mr. Ripley Bowman, Secretary of the Timber Conservation Board, for timely assistance and advice.

Cost Department

Thomas J. Burke, director, presented the following report for the cost department:—

Reports have been mailed to members during the year tabulating information relative to the following:

Selling and Distribution Expenses, Scheduling Production with Allowances for anticipated delays, Depreciation, Repairs and Replacements, Finishing Room Costs, Packing Differentials, Repairs and Maintenance Costs, and Costs of Felts and Wires.

In addition a number of special inquiries relating to accounting and cost problems and procedure were received from members during the year. The volume of this correspondence is increasing yearly, indicating a wider appreciation of the value to management of the data made available by the use of correct accounting and cost procedure.

Cost Divisions

The Cost Department has three Divisions, which have held meetings during the year, as follows:—

Connecticut Valley Divisions	6 Meetings
Kalamazoo Division	10 Meetings
Wisconsin Division	4 Meetings

The Director has attended these meetings whenever possible, and has addressed at least one meeting in each Division during the year.

Mill Visits

The Director has visited 58 member mills during the year, the amount spent in travelling approximating $1,000.00, the total amount available for this purpose. The time occupied was a little over eight weeks in all.

Non-member mills in the vicinity are also visited on these trips, in order to solicit membership in the Association, and at least one such membership was secured, worth $250.00 per annum. In addition, in some cases fees were paid for special visits where more than the usual amount of time was requested.

"Pulp and Paper Profits"

It was decided to invite non-members to subscribe for this Monthly Journal. To date 90 mills have done this at a cost of $2.50 per annum.

Member mills were asked to list the names of officers desiring to receive the publication, and nearly 500 names are now listed making a total of nearly 600 copies sent to members and subscribers. Over 200 copies are still sent gratis to other mills as part of the general educational work being done by the Department.

As a result of economies effected in the printing cost, it is expected that at least half this cost will be covered by receipts from subscribers and advertising during 1932.

Cost Section

Until June this Section appeared regularly weekly, in one of the Trade Journals but since that date, it has only appeared every second week. This is due to the fact that their available space has been reduced, owing to the falling off in advertising received. It is expected that when business improves, this Section will again become a regular weekly feature of this Trade Journal. In addition, material relating to the general work of the Department has been supplied to the other Trade Journals.

Meetings

Due to economic conditions, the usual Fall Meeting of the Department was discontinued this year. A meeting however, has been arranged to be held during the Annual Meeting of the Association.

This meeting will cover the work initiated by the appointment of the Committee on Uniform Accounting and Cost Procedure, appointed by President S. L. Willson, last year, under the Chairmanship of Mr. James A. Reilly.

In view of the fact that very few executives are members of the Cost Committee and the Committee on Uniform Accounting and Cost Procedure, it is again recommended that an appropriation of at least $500, be included in the Cost Department's budget to be used when necessary, to pay the travelling expenses of members of these committees to attend meetings of their respective committees.

Employment Bureau

As is to be expected, many more requests were received from accountants seeking employment than from mills requiring accountants during the year. However, the Department was called on in a fair number of cases to recommend men for vacancies, and succeeded in five instances in securing suitable men for the jobs available.

General

There is undoubtedly a growing desire throughout the industry for more accurate presentation of cost facts. The prevailing sub-normal conditions necessitate the use of very careful management methods, if losses are to be avoided. This has had the effect of causing executives to scrutinize their cost statements with a great deal more careful thought than perhaps they were accustomed to give them when their mills were operating under more normal conditions.

It is felt therefore, that this report might well be concluded with the following extract from the report of our Sub-committee on "Balance Sheets", written by Mr. J. L. Henson, Asst. Secretary-Treasurer and Comptroller of the Champion Coated Paper Company:—

"One of the crying needs of the paper industry is a greater uniformity of practice in its accounting methods and systems. No doubt the underlying cause of this lack of uniformity is the fact that excessive individualism, together with unnecessary secrecy, has hampered any efforts towards standardization. Other industries have overcome similar handicaps and have made considerable progress in modernizing and correcting their conditions. Undoubtedly these movements have been beneficial to them individually and collectively. *The benefits have been startling in many instances.* The paper industry, by pursuing a similar progressive course, can expect simplification and standardization as well as uniformity, *all of which should have considerable corrective influence on operating conditions and profit.*

"The accounting scheme of any industry should be lucid and illuminating, as well as accurate. With respect to such matters as nomenclature, classification, and arrangement of the accounts, they should be so established and understood that their interpretation will be uniform among all mills in the industry. The fundamentals and elements should be practically the same in all classes of mills. Certain standards have been, and are being set by professional accountants as the leaders of thought in that direction. The preparation of financial statements, and their interpretation, should be on the basis of the best practice and the executives of the industry have a right to expect modern accounting principles to be used. The basic accounting system should be well equipped to accurately report to them the financial condition and results of operation of the business. The accounting should be sufficient to recognize *and point out significant facts which may be utilized by the management in correcting faults and formulating policies of business administration.*

"In order to promote greater uniformity in the industry, it is the present aim of the Cost Department of the Ameri-

can Paper and Pulp Association to endeavor to establish well recognized principles as a common base, and it is hoped that all mills will gradually adopt these principles. The program of the Cost Department of the Association is none too ambitious to enter into thoroughly and wholeheartedly. The results of the program will depend a great deal upon the cooperation obtained from the industry, and the measure of cooperation received will depend on the intelligent and tactful aggressiveness exerted in placing the program before the Association."

Statistical Department

John C. Kavanagh, director, presented the following report for the Statistical Department:—

During the past two years, American business has been faced with the elimination of the excesses of a double inflation—the war and post-war inflations. As a result of a series of crises in this period, industrial activity has been curtailed and although the levels of production in the paper industry have not been so seriously affected as in most other major industries, nevertheless it has had to revise many of its policies.

The sharp change in industrial conditions has affected different sections of the paper industry in different degrees with consequent alterations in the lines of competition. The so-called "cultural grades" such as newsprint, book, writing, etc., have reacted most sharply to current conditions, while the "mechanical grades," board, wrapping, bag, etc., have maintained a greater degree of stability in operations although operating at reduced levels

The process of liquidation has taught the paper industry several valuable lessons, the foremost of which is the necessity for wider and cheaper distribution. Production technique has progressed too rapidly for the methods of distribution and greater efforts are needed to bring marketing methods to a point which will be less costly to the industry and more effective in allocating the mass production to the proper consuming centers.

Changes in commodity price trends and competition from foreign sources where the gold standard has been abandoned, have unsettled domestic market conditions and left the raw material market clouded with uncertainties in regard to supply and demand.

Competition in the many unorganized groups of the industry has been so affected by curtailed demand that the necessity of organizing and studying common problems hase been clearly brought home.

As these changes in conditions within the industry have occurred, the Statistical Department has adapted its work to these changing conditions and expanded its service to the industry while at the same time adapting itself to the retrenchment program of the Association, which has necessitated reductions in both budget and personnel.

The Weekly Business Review

A number of changes have occurred in domestic business activity in the past year which, coupled with uncertain foreign business and financial conditions, have caused business men to consider more closely numerous basic economic problems. The *Weekly Business Review* has carried unbiased articles accurately summarizing important economic changes as they related to the paper industry. Such topics as Employment, Wages, The Gold Standard, Shifts in Foreign Wood Pulp Supplies, The Distribution of Paper and other current economic matters were reviewed along with the current synopsis of general business, paper and pulp, and raw materials. The favorable comments which we have received indicate that the *Weekly Business Review* is filling a very definite need and we are making every effort to make this review more valuable to the executives of the industry.

The Monthly Statistical Summary

The trend of operations in the various grades of paper and pulp has been watched more carefully during the past year, and the *Monthly Statistical Summary* has been a valuable factor in supplying a crosssection of operations in the major grades of pulp and paper. A great deal of shifting from one grade to another has occurred in the past two years, and we have attempted to point out the fact that conditions in one grade are no more promising than in another and that all have felt the pinch of diminished demand. The size of the summary has been increased to allow more space for explanation of the large volume tabular data. The American Paper and Pulp Association, by means of the *Monthly Statistical Summary*, has been able to keep an unbroken run of current data on grades, such as Sulphite Bag and Sulphite Wrapping, which were unorganized and had no agency to keep up this work. The *Monthly Statistical Summary*, in addition, is the only source of current data on domestic pulp operations and these data have proven to be valuable in gauging the condition of the pulp market and the effects of foreign imports. Purchasing agents, as well as sales managers, who are making a closer study of trends in order to better analyze market conditions, have made wider use of this publication during the past year.

Requests for Information

The Statistical Department received a somewhat greater number of requests for information during the past year than in previous years, both from members and non-members of the industry. This year, the major part of the requests received dealt with distribution, raw materials, and market information. The volume of requests for information on raw materials led us to make a canvas of the industry to determine whether or not the purchasing agents of the industry would desire to cooperate with us in the exchange of market data and thereby to make available information on the supply and demand of the raw materials markets.

Special Services

Surveys: There has been an unusually large demand for data pertaining to the distribution of paper and pulp and also operating reports of a more specific nature concerning certain individual grades. In the case of book paper, we have prepared and distributed quarterly reviews of the trend of coated and uncoated book papers, advertising, printing, capacity, consumption, etc., together with charts illustrating these trends. In the case of glassine, greaseproof and manifold papers, we expanded the type of report to show grade operations more accurately and also furnished reviews with charts of the individual mills' operations as compared with the group as a whole.

Distribution: In regard to furnishing market data of a specific nature, we have cooperated closely with the United States Bureau of the Census in the preparation and publication of sales data on the paper industry. We have published information on the wholesale, converter and direct sale of paper and the consumption of the various kinds of paper by converters.

Foreign Pulp Imports. Our imports of pulp from various countries have been shifting during the past few years and in order that the industry might know how our imports from different countries compared with previous years we have run special tables in the *Weekly Business Review* comparing our monthly imports in the current year with the two previous years. Through the cooperation of the Bureau of Foreign and Domestic Commerce, we are able to publish this data almost a month

before it appears in the government publications. Current data on our imports and exports of paper are also published in the Paper and Wood Pulp section of the *Weekly Business Review.*

PULP INVENTORY: Early last year there arose the necessity of determining the effects of the reduced demand for pulp on stocks of pulp at the mills and foreign pulp in warehouses. The Statistical Department sent out questionnaires and received replies from mills representing about 80 per cent of the pulp purchases. We prepared and distributed a detailed analysis of the condition of pulp stocks and also the source of these supplies. This was the first comprehensive study of its kind made and took about two months to compile. The replies we received from a great number of mills indicated that this study was of considerable value to them in determining their pulp purchasing policies for the year.

PURCHASING AGENTS: The rapid change in the raw materials market brought many requests for information on these conditions and the paper and pulp section of the National Association of Purchasing Agents asked us to quote a price for a commodity service. We did this but later it was decided that this Association should try to interest all the purchasing agents in the industry in cooperating with us so that we could render a service to the entire industry rather than to a smaller group. We have already requested the cooperation of all purchasing agents and the replies to date are encouraging.

ROUTINE: In addition to the work outlined above, the Statistical Department prepared and distributed special weekly reports on coated and uncoated book paper: cardboard; kraft; glassine, greaseproof and manifold; and special monthly reports on boxboard and pulp operating efficiencies for sulphite, kraft and groundwood mills. The department also cooperated closely with the United States government bureaus in the development of all information pertaining to the paper industry in order that the information prepared by the federal bureaus will meet the needs of the industry as closely as possible. The material prepared for the general publication received wide publication in the newspapers throughout the United States and in the domestic and foreign trade journals.

Resolutions

IN MEMORIAM

Be it Resolved, That the Association expresses its sorrow over the loss of those friends and companions who were called by death during the year, and formally notes its appreciation of their influence upon the development and welfare of the industry; and be it further

RESOLVED, That their companies be notified of this tribute to their memories.

Frederick H. Babbitt, President, Babbitt-Kelley Company.

Edward P. Bagg, President, Millers Falls Paper Company & Parsons Paper Company.

Joseph A. Bicking, President & Gen. Mgr., S. Austin Bicking Paper Mfg. Co.

Arthur T. Brown, Manager, Nicolet Paper Company.

Louis M. Brown, Secretary, Finch Pruyn and Company.

W. F. Brunner, President, Paterson Parchment Paper Company.

Clarence W. Campbell, V. P., Dexter Sulphite Pulp and Paper Company.

James L. Coker, President, Carolina Fibre Company.

Harry H. Cook, President, Alexandria Paper Company.

Alvah Crocker, Crocker-Burbank and Company.

A. D. Daniels, President, Daniels Mfg. Co. and V. P., Rhinelander Paper Co.

Philip T. Dodge, formerly President of International Paper Company.

W. H. Eaton, Vice-President and Treasurer, Eaton, Dikeman Co., Lee, Mass.

Elmer Garrett, President Garrett Paper Corporation.

W. P. Hawley, formerly of Hawley Pulp and Paper Company.

E. A. Hotchkiss, Secretary, Joseph Parker and Son Company.

F. L. Kemp, Sec., & G. M., J. & J. Rogers Company.

Geo. W. Knowlton, President, Knowlton Bros.

John F. Kuster, Treasurer, Andrews Paper Co.

A. J. Lewthwaite, Formerly Vice-President, Crown-Willamette Paper Co.

George Little, President, Franklin Board and Paper Co.

Charles McKernon, B. D. Rising Paper Co., (Formerly President).

Judge Charles F. Moore, formerly secretary of American Paper and Pulp Association.

Raymond J. Parham, Sales Manager, St. Regis Paper Company.

Frank Parke, Secretary-Treasurer, Downingtown Mfg. Company.

Waldo E. Pratt, Chairman of Board, Hollingsworth and Whitney Co.

J. W. Quimby, Manager New York Office, Allied Paper Mills.

John B. Rieg, President, Eving Paper Mills.

Thomas J. Rogan, Vice-President Fritchburg Paper Co.

W. N. Smith, President and Treasurer, Bogota Paper and Board Co.

Peter G. Thomson, President, Champion Coated Paper Company.

I. O. Van Duzer, General Manager, Louis Dejonge and Co.

Geo. R. Wallace, President and Treasurer, Fitchburg Paper Co.

Thomas E. Warren, General Manager, Ticonderoga Pulp & Paper Co.

H. M. Wheelwright, George W. Wheelwright Paper Co.

THE TIMBER CONSERVATION BOARD

WHEREAS: There is increasing evidence that present economic trends in forest products industries demand the use of accurate current data as to available timber supplies, their production and consumption; and

WHEREAS: It is highly desirable that every effort be made to coordinate the activities of private and governmental agencies toward the securing of such data, and of all other information pertinent to the economic perpetuation of the forest resources of our nation as has been accomplished during the past year through the functioning of the Timber Conservation Board; Therefore be it

RESOLVED: That the American Paper and Pulp Association urge the continuance of such an independent Board, or Council, made up of representatives of the Public, of Forest Products Industries, and Government Departments;

That all possible cooperation between private and governmental agencies may be secured in making available essential and accurate quantitative data, and sound conservation measures, concerning the forest resources of our country to the end that the wood using industries may proceed soundly on a basis of facts and that the Public may be equally informed as to the true timber situation of the country upon which rests the successful future of the pulp and paper industry and that of all wood using industries.

FORESTS PRODUCTS LABORATORY

WHEREAS: A bill now pending in Congress proposes to materially reduce the appropriation for the Paper Division of the Forest Products Laboratory, which would delay and cripple its constructive activities to improve pulping processes for woods now in use, and would compel the cessation of the work being done by the Laboratory to develop processes enabling the utilization of additional varieties of woods; and

WHEREAS: Past appropriations have not been substantially increased but have been maintained in amounts that now are not inconsistent with the current economy program of the Federal Government; and

WHEREAS: Such activities tend to increase the value of our natural resources, and to augment the sources of public revenues; and

WHEREAS: The immediate saving effected would be more than offset by the loss of the large gains in public revenues that would result through the continuation of the work, not to mention the loss of the stimulating effect of the work of the Laboratory upon existing pulp and paper mills; therefore be it

RESOLVED: That the American Paper and Pulp Association be authorized and directed to petition Congress to restore the budget items for Paper Division of the Laboratory, which have been eliminated or reduced.

BRINGING TOGETHER OTHER GROUPS

WHEREAS: The American Paper and Pulp Association has affiliated with it many groups of trade associations to whom benefits are accruing because of such association relations; and

WHEREAS: Other groups of the paper industry, such as book manufacturers, pulp manufacturers, and others have not yet availed themselves of the services of the Association because of a division of viewpoints between the individual members of such groups; therefore be it

RESOLVED: That the officers of the Association be requested to use their best efforts and their facilities to bring together such groups in an effort to harmonize such differences as may exist, in order that their individual interests and the interest of the Association and Industry may be enhanced.

DISAPPROVAL OF PREFERENCE BILL

RESOLVED: That the American Paper and Pulp Association expresses its disapproval of H. R. 8909, a bill to compel contractors on government works to give preference to materials of local origin, and further to limit purchases by government departments to materials of domestic origin.

COURTESY

BE IT RESOLVED: That the American Paper and Pulp Association extends to the officers, members of the Executive Committee, and the members of the Association Committees, its sincere thanks for their personal efforts and assistance both in the interest of the whole paper industry, and in reorganizing the Association that it might more fully meet its obligations to the industry; and be it further

RESOLVED: That the American Paper and Pulp Association expresses its appreciation for the loyalty and the service of the Association staff during the current year.

Pulp Testing Chemists

R. G. Macdonald, chairman, made the following report for the joint committee on Approved Pulp Testing Chemists:—

The Joint Committee on Approved Pulp Testing Chemists representing the American Paper and Pulp Association, the Association of American Wood Pulp Importers and the Technical Association of the Pulp and Paper Industry, has been very active during the past year giving consideration to a number of applicants for appointment as approved chemists.

Two acts of the committee are of particular importance, namely, the decision made to require all approved chemists to register annually and the revision of Article 9 of the official rules.

The need for an annual registration has been evident for some time in view of the fact that many approved chemists move to new locations and frequently get out of the industry. This year and hereafter any chemist failing to register before January 15th will be dropped from the list. A list of the available approved chemists will be published annually in the trade journals.

Article 9 of the official rules for weighing, sampling and testing wood pulp for moisture has been revised by the committee to read as follows:

"In case of dispute, a retest shall be made either by one approved chemist acting for and mutually agreed upon by both parties, or a joint test shall be made by approved chemists representing both parties and mutually agreed upon them. In case of a joint test both chemists or their authorized representatives shall be present during the sampling and weighing and subsequent testing of samples, but only one set of samples shall be obtained from the bales weighed and these samples shall be dried in an oven approved by both chemists. Retests coming within 1 per cent of the original air dry weight of pulp as invoiced will be deemed to uphold the original invoice. When retests show a greater variation than 1 per cent, adjustment shall be made upon actual basis of such retest. In all cases expenses incidental to the retest shall be paid by the party in error.

Note: It is preferable that neither approved chemist in a joint test should be in the regular salaried employ of either interested party, but in the event that one or both of the approved chemists be a salaried employe in the service of either party, no charge shall be made for the services of such chemist or chemists.

Retests shall not be made on pulp which has been unduly exposed to the weather or other unusual conditions of moisture or heat, except by special agreement between shipper and consignee.

Note: Wherever possible, in all cases of dispute, the shipment should be kept intact and in no case shall there be less than 50 per cent of the lot presented for retest."

The committee acted in a number of cases to interpret the rules for the benefit of buyers, sellers and testers of pulp.

Copies of the rules are available at fifty cents per copy from the American Paper and Pulp Association.

Pulpwood Department Meetings

Two interesting sessions were held on Wednesday by the Pulpwood Department of the American Paper and Pulp Association at the Hotel Pennsylvania, New York. Charles W. Boyce, secretary of the American Paper and Pulp Association gave an instructive address on "Co-Operation in the World's Wood Pulp Industry." He said in part:

"Some producing countries object to the world statistical plan on the ground that it gives pulp consumers information that permits them to control markets. This is obviously dependent upon the cooperation between the producers, for the producers, themselves, with the same

information are in a position to maintain market positions. It is difficult to see how either purchasers or sellers may establish monopolistic control; they certainly have not in other industries which are kept thoroughly informed concerning world production and shipment.

"Swedish producers are particularly against the world statistical plan. Their opposition may be a hangover from former years when they dominated European pulp markets. Under those monopolistic conditions, perhaps it was the part of wisdom to keep the buyer uninformed. But Sweden no longer dominates European conditions nor can it for long dominate the American market for domination means price control and that means but one thing, increased production or wide substitution.

"Manufacturers of all commodities now realize that the days of abnormal profits derived from monopolistic price control are gone. Too much unused capital seeking profitable employment is available to develop the too great reserves of available raw materials. Industry is learning that it must be content with a profit that is fair to its stockholders and wagearners and to its customers in like degree. Even in this period of their control, buyers know that they may buy at prices that are too low. As a matter of fact, they begrudge no producer a fair price, if all producers hold for fair prices. No enlightened, fair-minded-seller or buyer can object to business conduct that is just to all.

"The world pulp industry is faced with a choice; it may continue in its present course of rank nationalism and special interest, or it may cooperate to protect its present and its future. After all, there is no real choice; too great penalties are piling up that may crush those who stand to reap the most in unequal benefit. There is but one choice, and that is a world-wide cooperation which may begin with monthly surveys of woodpulp statistics."

J. A. C. Kavanagh, of the Statistical Department of the American Paper and Pulp Association, discussed "Wood Pulp Statistics"; C. M. Baker, of the Engineering Department of the American Paper and Pulp Association. spoke on "Pulp Mill Waste Disposal"; T. J. Burke, of the Cost Department of the American Paper and Pulp Association, gave an address on "Costing Pulp Manufacture"; and Maximillian Krimmel, president of the Technical Association of the Pulp and Paper Industry, summarized the "Pulp Testing Committee Work of the Technical Association."

There was "A Symposium on Current Conditions of Pulp Manufacture in the North East" by S. B. Copeland, of the Eastern Manufacturing Company; the Lake States. by Folke Becker, of the Rhinelander Paper Company; the South, by J. P. Hummel, of the Hummel-Ross Fibre Company; and the Pacific Coast, by Ossian Anderson, of the Puget Sound Pulp and Timber Company. "Foreign Competition from Countries with Depreciated Currency," was the subject of a comprehensive and valuable talk by Reuben B. Robertson, of the Champion Fibre Company, of Canton, N. C.

Cost Department Meetings

As usual, the meetings of the Cost Department of the American Paper and Pulp Association, which were held in the Pennsylvania Hotel on Monday and Tuesday, aroused intense interest.

In the opening address, "Uniform Cost Accounting" was discussed by James A. Reilly, comptroller of the American Writing Paper Company, and chairman of the Committee of Uniform Accounting and Cost Procedure. He said in part: "The first and foremost objective is to be sure that we are all figuring our costs on the same basis so that our resulting selling prices will be based upon similar information. This involves the establishing of a procedure which when the different members examine their own existing procedure and compare it with the uniform procedure adopted, will enable them to know whether they are including all of the items in their costs.

"The second objective is to set up a uniform procedure with regard to financial statements so that future statistics collected for the Industry will be on a comparable basis and therefore will be of more use to its members. Such a procedure need not alter the existing account practice of any institution except such minor changes as may be necessary to accumulate information so that reports rendered to headquarters can be made in the standard form. In fact, none of the Uniform Accounting Procedure adopted need be necessarily incorporated in existing systems nor would it be necessary for any member to change his system or supersede it by the procedure adopted. However, a well thought out Uniform procedure may in time supplant existing accounting systems in a great many organizations, but it should be a voluntary matter with these organizations."

At the luncheon meeting for executives, Allen Abrams, of the Marathon Paper Mills Company, vice-president of the Technical Association of the Pulp and Paper Industry, discussed "Rational Manufacture" in an interesting and instructive manner.

J. A. C. Kavanagh, statistician of the American Paper and Pulp Association, reviewed the changes in population growth, the channels of distribution, and the characteristics of certain markets, to illustrate the relative importance of the fact that the possibilities for improvement lie in the direction of a more effective and more efficient distribution technique in the paper industry.

C. M. Baker, engineer of the American Paper and Pulp Association spoke on "Profit Leaks" at the concluding session on Tuesday afternoon. His address was very timely and worth-while and was thoroughly appreciated by all present.

Fibrous Raw Materials Meeting

A joint meeting was held at the Hotel Pennsylvania Monday by the Fibrous Raw Materials Committee of the Technical Association of the Pulp and Paper Industry and the Pulpwood Department of the American Paper and Pulp Association at which some papers of more than usual interest and importance were presented. The following program was carried out:

"Common Problems of Technical Men and Wood Department Managers," George N. Ostrander, of Finch, Pruyn & Co., chairman of the Pulpwood Committee of the American Paper and Pulp Association.

"Pulpwood Evaluation," C. E. Curran of the Forest Products Laboratory, Madison, Wis.

"Pulpwood Storage and Handling in Woodyards," R. D. Stephens, of the Eastern Manufacturing Company, Bangor, Me.

"Pulpwood Grading," Howard Churchill, of Finch, Pruyn & Co., Glens Falls, N. Y.

"The Timber Conservation Board," Ripley Bowman, Secretary Timber Conservation Board.

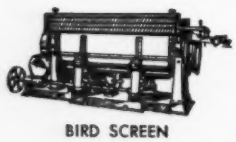
"Moving Pictures of Logging and Mill Operation," Finch, Pruyn & Co.

"Purposes of the Raw Materials Division of the Technical Association of the Paper and Pulp Industry," J. L. Parsons, of the Hammermill Paper Co., Erie, Pa., chairman of the Raw Materials Division of the Technical Association of the Pulp and Paper Industry.

"Fibrous Materials for Paper Making in the Future,"

for better paper that costs less...

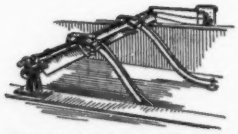
BIRD MACHINERY



BIRD SCREEN

BIRD CENTRIFINER

VICKERY *HI-FLEX* DOCTOR



VICKERY FELT CONDITIONER

BIRD SAVE-ALL

BIRD MACHINE COMPANY

South Walpole ◥◤ Massachusetts

5284

Technical Discussion, John Traquair of the Mead Company, Dayton, Ohio, chairman of the Fibrous Raw Materials Committee of the Technical Association of the Pulp and Paper Industry. Economic Discussion, R. S. Kellogg, secretary of the News Print Service Bureau, New York.

"Effects of Kinds and Qualities of Pulpwood Upon Pulp Quality," Dr. Otto Kress, director of the Institute of Paper Chemistry, Appleton, Wis.

"Regional Competitive Changes and Pulp Manufacturing Costs," Charles W. Boyce, secretary of the American Paper and Pulp Association.

Waxed Paper Association

Judge Markham M. Flannery, chairman of the Trade Conference Division of the Federal Trade Commission, addressed the American Waxed Paper Association representatives at their annual meeting at the Hotel Pennsylvania on February 17. The Waxed Paper Manufacturers have held two trade conferences before the Federal Trade Commission concerning their proposals and program to eliminate unfair competition in this branch of the paper industry.

Last May the Federal Trade Commission revised all trade practice rules in various industries, including those of the waxed paper manufacturers. The revision was not accepted by the American Waxed Paper Association because the rule applying to etchings had been discontinued by the Commission. A number of meetings between the manager, counsel and the Commission were held and it was not until the latter part of January of this year that the Federal Trade Rules again became a part of this industry's procedure.

The industry now has eight additional rules to offer. These rules apply to secret rebates, secret discounts, secret allowances, false reporting of costs, and various other practices which are not uncommon to industry today. Judge Flannery discussed these rules and the progress of the industry. His address was of vital interest to all waxed paper manufacturers, and was greatly appreciated by those present.

Following the announcement by Paul S. Hanway of his resignation as secretary of the American Waxed Paper Association, effective April 1 next, the Executive Committee of that organization decided to merge with the American Paper and Pulp Association.

Paper Salesmen's Annual Meeting

There was an excellent attendance at the Thirteenth Annual Meeting of the Salesmen's Association of the Paper Industry, held at the Hotel Pennsylvania, New York, on Tuesday morning. President H. R. Knott, delivered a cheerful message to the members. He said in part:

"When a constructive move is made by any group on Trade Customs or prices or whatever it may be; get behind it and help put it across, even if it does not pertain to your own grades. That is the type of cooperation this association stands for and that, and that alone, is going to bring back confidence in the mills. Any one foolish enough to believe it possible to progress and make profits until that confidence is restored is doomed to disappointment.

"The key to the return to prosperity is in the hands of the salesmen of this country. Without orders, manufacturers cannot operate and without profits the manufacturers cannot continue. It is, therefore, up to each salesman to bring about the restoration of a condition whereby orders will again be taken on a profit yielding basis. You are the men in the field and as you counsel your customers and your officials so will they be able to steer the craft of the paper industry again into clear waters. Make sure of your counsel and through constructive cooperation those that depend on your guidance will be able to steer through fog quickly and safely."

Officers for the forthcoming year were re-elected, as follows:

President, Harold R. Knott, Eastern Manufacturing Company, Chicago, Ill.

Vice-President, Eastern Division, Frank H. Purington, Eastern Manufacturing Company, New York.

Vice-President, Mid-Western Division, Creighton Whiting, American Writing Paper Company, Chicago, Ill.

Secretary-Treasurer, Douglas A. Crocker, 370 Lexington Avenue, New York.

Sulphite Institute Formed

The Sulphite Paper Manufacturers on Tuesday formed an organization to be known as "The Sulphite Institute." There were twenty-three mills present at the meeting in the Hotel Pennsylvania, all of which supported this movement. The combined production of mills represented totals 1600 tons per day or 40,000 tons per month.

This is the first time in the history of the industry that all sections of the country—East, Central, West, and Pacific Coast—have presented a united front.

Several constructive suggestions were discussed and definite moves were made to correct some of the prevailing evils.

E. W. Kiefer, of Port Huron Sulphite and Paper Company, acted as chairman; and George Stuhr, of the Continental Paper and Bag Corporation, as secretary.

The following were elected members of the Executive Committee:

R. A. McDonald, Crown Willamette Company, of California.

George Houk, Hawley Pulp and Paper Company, Oregon.

John Alexander, Nekoosa-Edwards Paper Company, Wisconsin.

Guy Waldo, Flambeau Paper Company, Wisconsin.

E. W. Kiefer, Port Huron Sulphite and Paper Company, Michigan.

R. A. Hayward, Kalamazoo Vegetable Parchment Company, Michigan.

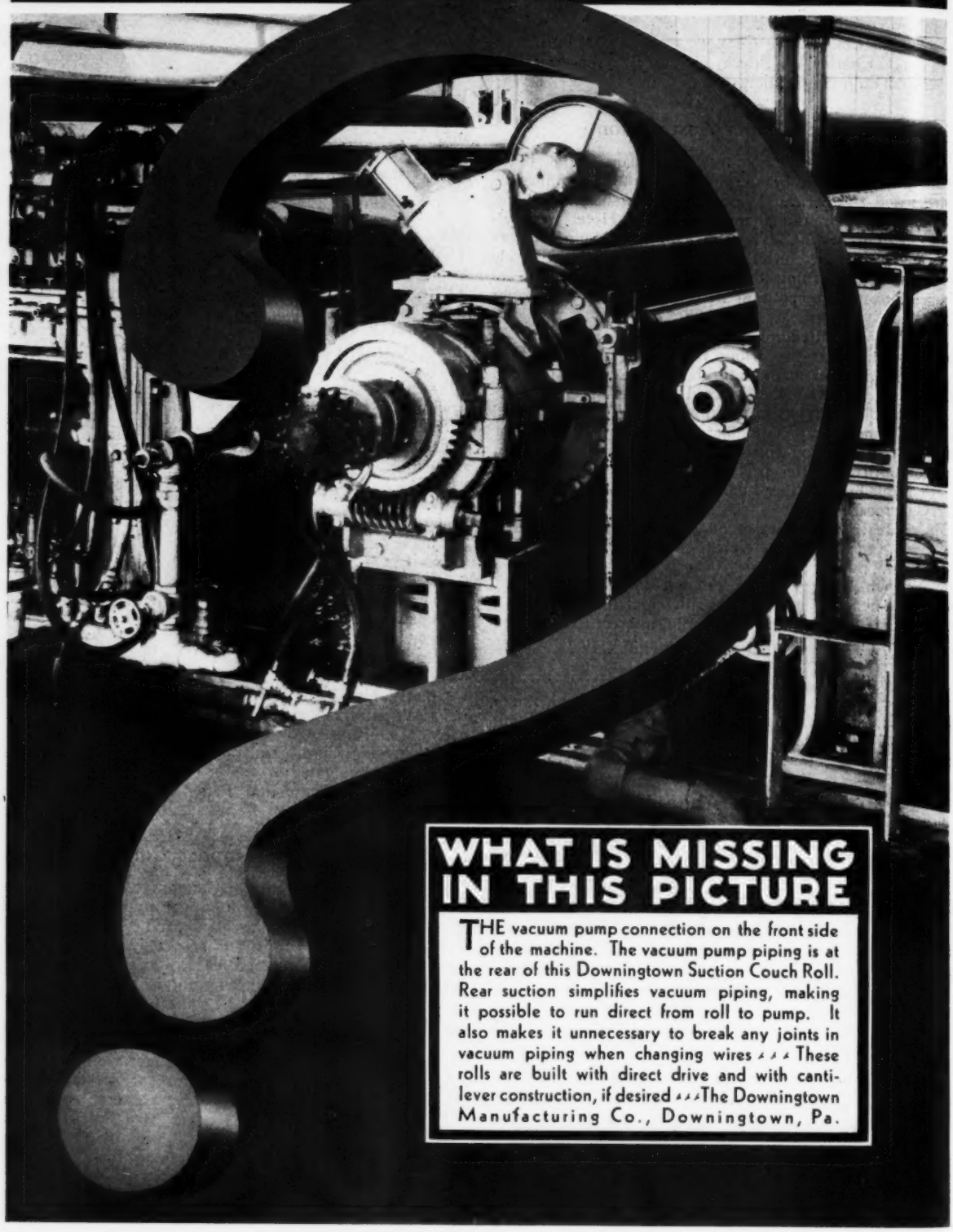
Geo. Stuhr, Continental Paper and Bag Corporation, New York.

Work of the Import Committee

Steps taken by the Import Committee of the American Paper Industry to stop the improper importation of various papers, misclassified as standard news print, are described in a special convention report by Warren B. Bullock, manager of the committee.

Bright colored poster news print is being imported in the Middle West and on the Pacific Coast for use in job printing establishments improperly classified as standard news print, duty free. Steps have been taken to have this paper classified for duty at ¼ cent per pound and 10 per cent, as printing paper, both because of the color which makes it impracticable for use in newspapers, and because it is in sheet form, which is never used by newspapers, for their sporting extra editions. One importation is reported to be for a newspaper, seeking the privilege of free importation because the importer is a newspaper, even though the paper is for use in its job printing branch.

DOWNINGTOWN



WHAT IS MISSING IN THIS PICTURE

THE vacuum pump connection on the front side of the machine. The vacuum pump piping is at the rear of this Downingtown Suction Couch Roll. Rear suction simplifies vacuum piping, making it possible to run direct from roll to pump. It also makes it unnecessary to break any joints in vacuum piping when changing wires ▲▲▲ These rolls are built with direct drive and with cantilever construction, if desired ▲▲▲The Downingtown Manufacturing Co., Downingtown, Pa.

Paper imported for Southern California public schools is being classified for duty as printing paper, but the importer claims it is standard news print duty free, and the importer is asking the United States Customs Court to admit the paper duty free.

Importers of bulky paper for tablet purposes have abandoned the case initiated in the United States Customs Court, in which it was claimed that such paper was duty free as standard news print, and the proper duty was collected. These cases involved importations for Texas and various northern states.

The import Committee also reported the taking of steps to prevent the misclassification or undervaluation of paper valued at about $85,000 in the past month. Cases in which the importers had asked the United States Customs Court to over-rule action of customs officials, as to papers valued at about $75,000, were abandoned before going to trail, and the proper duties paid.

Glassine Division

Thomas J. Burke, secretary of the Glassine Division presented the following report:—

The Glassine Division was inaugurated as a result of a meeting of Glassine Manufacturers held at the invitation of the General Manager of the Association, June 1st, 1931, at the Association's offices.

Since that date regular monthly meetings of the Division have been held as well as a number of Committee Meetings.

A set of Trade Customs has been drawn up and published.

Regular weekly statistical reports have been compiled by the Association's Statistical Department, covering Orders, (Received and Unmade), Production, Shipments, Stocks on Hand and Percentage of Operation.

In addition, charts have been prepared showing the "Daily Average Production" and the Monthly Production (on a six months' moving average), for the five years 1927 to 1931 inclusive. Special Reports have been forwarded to each member of the Division, covering their individual records for this period.

Samples of Glassine have been submitted to the Secretary by each member and forwarded to a reliable Testing Laboratory, in order that the high standard of quality set as their goal by the members of the Glassine Division, might be maintained and improved.

A report on these tests is now in the hands of a Special Committee appointed to make recommendations based on the laboratory's tests of these samples.

Wage Rates

A summary of "wage rates" being paid has been compiled and forwarded to members.

Writing Paper Manufacturers

The annual meeting of the Writing Paper Manufacturers Association was held on Wednesday, February 17, at the Hotel Pennsylvania. The officers elected for the ensuing year were as follows:

President, Colonel B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.

Vice-President in Charge of Sulphite Bond Division, H. R. Baldwin, Hammermill Paper Company, Erie, Pa.

Vice-President in Charge of Rag Division, G. S. Morse, Valley Paper Company, Holyoke, Mass.

Secretary-Treasurer, E. H. Naylor, 95 State street, Springfield, Mass.

The Members of the Executive Committee are: G. S. Morse, H. R. Baldwin, J. E. Holmes, Chemical Paper Manufacturing Company, Holyoke, Mass.; Norman Bardeen, Lee Paper Company, Vicksburg, Mich.; W. C. Wing, Fox River Paper Company, Appleton, Wis., and Stuart B. Copeland, Eastern Manufacturing Company, Orono, Maine.

Cover Paper Association

The Cover Paper Manufacturers Association held its annual meeting on Tuesday, February 16, at the Hotel Pennsylvania. The following officers were elected:

President, Willis H. Howes, Knowlton Brothers Company, Watertown, N. Y.

Vice-President, R. S. Madden, American Writing Paper Company, Inc., Holyoke, Mass.

Secretary-Treasurer, E. H. Naylor, 95 State street, Springfield, Mass.

Members of the Executive Committee: Willis H. Howes, chairman, R. S. Madden, and J. B. Shepherd, Peninsular Paper Company, Ypsilanti, Mich.

Kraft Institute Meetings

The Kraft Institute held its meetings on Tuesday and Wednesday, February 16 and 17, at the Hotel Pennsylvania. The meetings were well attended by the kraft manufacturers and the paper bag manufacturers. Everyone seemed pleased with the present situation and the prospects for the future, on the realization that the progressive program was being carried steadily forward.

Binders Board Manufacturers

Members of the Binders Board Manufacturers Association gathered together at a luncheon Thursday noon at the Hotel Pennsylvania. The luncheon was well attended. Everyone seemed pleased with the present situation, and the prospects for the future of the industry looked brighter.

Cardboard Manufacturers Association

The Cardboard Manufacturers Association held its annual meeting on Wednesday in Exhibit No. 3 at the Hotel Pennsylvania. The meeting was well attended and the members discussed general business conditions in the industry.

Bristol Board Manufacturers

The Bristol board manufacturers held a well attended and interesting meeting on Wednesday morning in Exhibit No. 4 at the Hotel Pennsylvania. Business conditions were freely discussed by those present.

Glassine Manufacturers Meet

The glassine manufacturers gathered together Wednesday afternoon, February 17, at the Hotel Pennsylvania and discussed matters of timely interest. The meeting was well attended.

A. L. Sherwood Resigns

A. L. Sherwood has resigned his position as chemical engineer and assistant to the paper mill superintendent of the National Folding Box Company and is at present located at 19 Barnett street, New Haven, Conn.

TWO good bets for paper makers!

The KALBFLEISCH CHEMICALS of SERVICE for PAPER

KALBFLEISCH SULPHATE OF ALUMINA—

manufactured from finest raw materials, under rigidly controlled conditions. Kalbfleisch Sulphate of Alumina is low in iron content, high in uniformity.

KALBFLEISCH DRY WOOD AND DRY GUM ROSIN SIZE—

used in the same formulae as liquid size. Many users of Rosin Size are already enjoying the advantages of this new economical, convenient, readily soluble form.

Look into these Kalbfleisch products before you finish placing contracts for the year's requirements.

A unit of American Cyanamid Company.

KALBFLEISCH

THE KALBFLEISCH CORPORATION, 535 FIFTH AVENUE, NEW YORK, N. Y.

ERIE, PA.
ELIZABETH, N. J.
KALAMAZOO, MICH.
WATERBURY, CONN.
CHATTANOOGA, TENN.
DeQUINCY, LA.
PENSACOLA, FLA.
KOKOMO, IND.
CINCINNATI, OHIO
CAMP VERDI, ARIZ.
JOLIET, ILL.

National Paper Trade Association Meets

J. F. Miller, of the Chope-Stevens Paper Co., Detroit, Mich., Is Elected President at the Twenty-ninth Annual Convention of the Organization at the Hotel Pennsylvania, New York, February 15-18—Retiring President Blackman Makes Plea for Cooperation

J. F. MILLER, of the Chope-Stevens Paper Company, Detroit, Mich., was elected president of National Paper Trade Association of the United States at the twenty-ninth annual convention of the association held at the Hotel Pennsylvania Monday, Tuesday and Wednesday of this week. The other officers elected were as follows:

Vice-President in Charge of Wrapping Paper Division, Sidney L. Wellhouse, National Paper Company, Atlanta, Ga.; Vice-President in Charge of Fine Paper Division, A. W. Leslie, John Leslie Paper Company, Minneapolis, Minn.; Treasurer, Charles Addoms, Miller & Wright Paper Company, New York; Executive Secretary, A. H. Chamberlain, 420 Lexington avenue, New York.

President's Address

A. W. Blackman, president, in his annual address said:—

As I am about to drop out of your picture, after three years of responsibility and strenuous service, I shall presume to express a few thoughts, founded on observations made during my various swings around the circle.

There is an old saying, "That if one knows too much about life, he will see so *much* tragedy that he cannot be comfortable." I certainly *have* seen a lot of tragedy and I am impelled to get some of it off my chest onto yours.

I consider the crying tragedy in our organization to be the criminal wasting of cooperative opportunity. I do not want to offend, but I feel that the time has come for us to face a few bald facts. When it comes to association possibilities, too many of us are simply human ostriches, burying our heads in the sand; seeing nothing, hearing nothing, saying nothing, doing nothing—just waiting and hoping. We pay our dues to our local and to our National associations, shut our eyes, fold our arms, and wait for some miraculous and mysterious power to cure all our troubles. Because the expected miracles fail to materialize, we blame someone else.

Let George Do It

Some of us are woefully lax in attending meetings and, when we do attend, are apt to scoff at what we hear. We are prone to decline committee appointments and, if and when they are *wished* on us, we frequently let the exceptional and willing "George" do the real work.

Is it any wonder that relatively we accomplish so little, locally and nationally? It is really surprising that we have made as much progress as we have.

Everywhere I roam I encounter altogether too many *lukewarm* members. I continually hear of poor attendance at local meetings. I run across an undue amount of

J. F. MILLER, President

A. H. CHAMBERLAIN, Secretary

HOW VALUE IS ASSURED IN EVERY HAMILTON FELT

Twenty-two different inspections to make sure that every Hamilton Felt is right . . . . .

THE making of a Hamilton Felt is a painstaking process. Each workman or operator is naturally an inspector of his or her own work. But over them, are also twenty-two departmental, or head inspectors who also check to see that everything is as it should be.

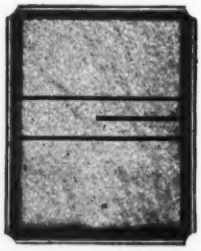
No person is the final inspector of his own work. Carelessness is too likely to slip in. And you can't be too careful of a Hamilton Felt, of any felt. Just a few threads, only a trifle off from perfection will throw a wrinkle clear across the felt — a wrinkle that will bother you as a paper maker as long as that felt is in service.

The reputation of Hamilton Felts is too precious not to safeguard it in every way possible.

Paper makers who use Hamilton Felts know what the reputation of Hamilton Felts stands for — the maximum production of the best quality of paper at a minimum expense of down-time, broke, and overhead. Try a Hamilton Felt. Prove to yourself that there are felts and Hamilton Felts.

SHULER & BENNINGHOFEN, Hamilton, Ohio
Miami Woolen Mills, Established 1858

Hamilton Felts



Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

suspicion and distrust, generated largely by lurid and exaggerated tales brought in by salesmen. I find an uncalled for amount of secretiveness and selfishness interfering with team work. I have heard even of cases of individual stubbornness so pronounced as to close the mind of its possessor to all forms of cooperative approach.

If you agree with me, as I know you must, that such conditions exist to a greater or lesser degree in your community, why not here and now resolve to apply the cure? Otherwise the patient who already shows signs of a temperature may get worse. He even might die, if the case is too long neglected.

Problem Purely a Family One

From now on we merchants, we middlemen, will certainly need all the help obtainable; and we can best help ourselves by helping each other. No one outside the trade is going to either mother or brother us; the problem is purely a family one, so why beat about the bush?

You know, and I know, that the fault lies with us as *individuals*. We must *give* more and not stress so much the point of *getting!* No one ever *gets* anything worthwhile without giving *first*. We have, I am afraid, been trying to operate hind-side-to, expecting to *get* something before we *gave*. I suspect some of us have broken away somewhat from our early Bible teachings.

If, as it would appear, we as a body have not advanced to the stage of acceptance and application of the Golden Rule, why not go back to where we *can* meet on common ground and start together from there.

The Way Out

Some 500 or more years before the time of Christ, there lived in China a certain philosopher named Confucius. Many of his writings have been preserved and are accessible. He must have been a prophet and a seer as well as a philosopher, for he foresaw our present, unsettled condition and pointed the way out through the following parable:

"The ancients who wished to illustrate illustrious virtue throughout the empire, first ordered well their own States. Wishing to order well their States, they first regulated their families. Wishing to regulate their families, they first cultivated their persons. Wishing to cultivate their persons, they first rectified their hearts. Wishing to rectify their hearts, they first sought to be sincere in their thoughts. Wishing to be sincere in their thoughts, they first extended to the utmost their knowledge. Such extension of knowledge lay in the *investigation of things.*

"Things being investigated, knowledge became complete. Their knowledge being complete, their thoughts were sincere. Their thoughts being sincere, their hearts were then rectified. Their hearts being rectified, their persons were cultivated. Their persons being cultivated, their families were regulated. Their families being regulated, their States were rightly governed. Their States being rightly governed, the whole empire was made tranquil and happy."—So wrote Confucius in "The Great Learning."

It would thus appear that even 2500 years ago the root, the heart, the very foundation of a good organization was "*investigation of things*" or, as we would term it today, *research*. Just what is meant by research? Charles F. Kettering was once asked to give a *definition of Research*, and this was his reply: "Research is a method of finding out what people will be wanting, when they are through wanting what they are wanting now."

Time for Action

Now, research calls for *initiative* and, again, initiative has been defined as "*imagination in action, dreams put to work.*" Is it not about time for us to stop dreaming, get into action, and cash in on some of our *past* dreams by putting them to work?

Should we not also cultivate the art of sitting down and *thinking things through?* Most of us are so muddled up with petty detail that we allow ourselves no time really to think. It is through initiative, research, and thinking things through that we acquire *wisdom*, for wisdom itself is in reality only an *intelligent mastery of facts.* If you will turn to the third chapter and thirteenth verse of Proverbs, you will read:

"Happy is the man who findeth wisdom, and the man who getteth understanding."

In modern parlance:

"Wisdom is the practical readjustment of life in terms of common sense."

Membership of 500

We now have a membership of practically 500. There are at least half as many more eligible houses that would gladly join hands with us if we but developed half the common sense possibilities that now await and demand our attention. We stand only on the threshold of cooperative opportunity.

If I may be so bold as to indulge in a little more constructive criticism, I will suggest that, having seen the light, we bury all the old, bloody hatchets now waving in our local associations and make a new start, a la Confucius, with Research as our base. We have only to look around to find that our Research (or Survey) Committees, after years of patient toil, have already developed an ideal Standard Accounting System based on common sense and especially fitted to our requirements.

This system has been approved and endorsed by every eminent authority to whom it has been submitted, and years ago our Association unanimously voted to adopt it. Is it in general use? From what I can learn I should say that about 25 per cent of our members have it in successful practice, another 25 per cent have turned it down on the supposition that it entails needless extra work; and the remaining 50 per cent do not apparently even know what it is all about. This is hardly what we would call "in general use." I would term this result of ten years' strenuous effort as a crying tragedy of *"cooperative negligence."*

Far To Go and Much To Learn

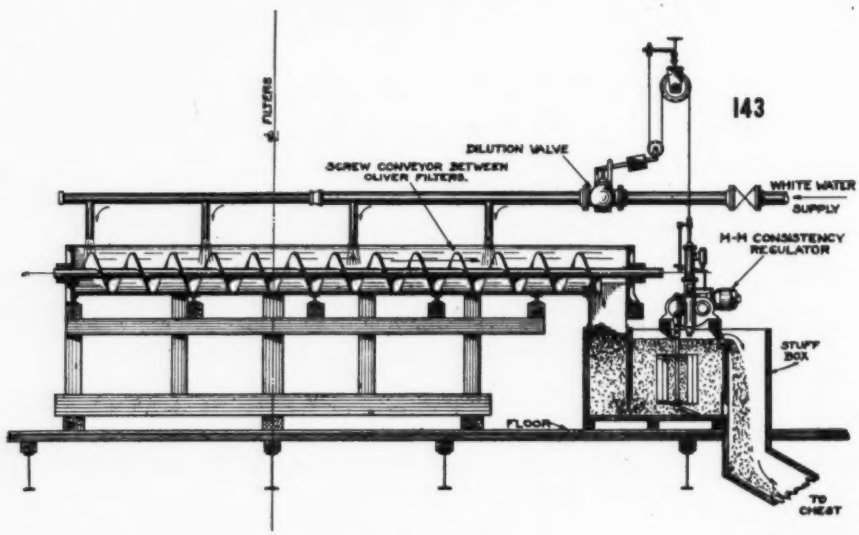
As vital facts of great comparative value, called for in our semi-annual questionnaires, cannot be brought out, except through the use of a standard or common form of accounting, the whole educational value of comparative trade *information* is thus lost to us. Who is there among us who presumes to have a knowledge greater than the combined knowledge of all the others? Many inviting paths of economics, yes, and of ethics, lie before us, as yet untrodden and unexplored. We have far to go and much to learn.

The speed of an all-conquering army is regulated by the speed of its foot soldiers and not by the speed of the mounted officers. To arrive at a given destination an army must *move* as a body, and to move it must first *start.*

Twenty-five per cent cooperation on the first step of a Standard Accounting System is merely a start. The Army is under way, however. We are headed in the right direction under able officers for 1932. So, let's get into step, round up the stragglers, and be on our way. With the ability and willingness of our full membership to give the desired information, our next questionnaire should bring out helpful facts of inestimable value to all.

As President Hoover recently remarked, "Our Commercial and Industrial System has become so complex and finely attuned that only those may hope to succeed who are informed."

ANOTHER KNOTTY PROBLEM SOLVED IN STOCK CONSISTENCY REGULATION BY A MEYERS-MESCO REGULATOR



THE S. D. WARREN COMPANY AT CUMBERLAND MILLS, MAINE,

manufacture the famous line of Warren standard papers. Their problem was to obtain uniformity of soda pulp density prior to the beaters so that the beating process and proportioning of additional materials thereto, could be made consistently uniform. Equally important was the accounting phase of the operation, which can be accurately carried out only if density is uniform. This installation presented an unusual problem in that

A LARGE VOLUME OF STOCK

had to be handled, while simultaneously reducing its consistency to good pumping and beating densities.

Above is shown a cut of the application of the Meyers-Mesco Consistency Regulator to this problem. Two Oliver Suction Filters are placed parallel and adjacent to each other, each discharging into a common screw conveyor placed longitudinally between them. The soda pulp is propelled to the discharge end of the conveyor and falls into a stuff box baffled as shown. From the stuff box, the pulp flows by gravity to a storage chest on a lower floor. Soda pulp is pumped directly to beaters from this storage chest.

The Meyers-Mesco Consistency Regulator is mounted on suitable supports on top of the stuff box in the usual way. But the very LARGE VOLUME of stock and GREAT DILUTION made it necessary to use the Model "H" Regulator, the capacity of which is virtually UNLIMITED. In this model, a small hydraulic cylinder sufficiently powerful to handle a large water valve is employed. In this manner, the sensitive elements of the regulator are called upon to handle only the pilot valve controlling the plunger and dilution valve movements. Thus GREAT ACCURACY is obtained even though large amounts of regulating water are required.

Regulating water from the dilution valve is admitted to the stock at several points within the conveyor. This eases the work on the conveyor and thoroughly mixes the diluting water and heavy stock; lumps are well broken up. Mill white water is used from the plant gravity system.

This regulator is called upon to dilute 200 tons of soda pulp per day from approximately 8% to 5.0% in one step, calling for an accurately controlled water supply of about 250 GALLONS PER MINUTE. Or it may be required to work at any fraction of this amount without sacrificing accuracy.

This installation was guaranteed to maintain density within .15% above or below a given average density. That is, the density must not vary more than a total of .3%. At all times since its installation, the machine has done this to the satisfaction of its owners. The regulator accurately and reliably smooths out density variations in stock as it comes from the filters regardless of the cause of such variations. Needless to say, beater room soda stock conditions are very uniform with all the consequent advantages that efficient regulation can give.

SALIENT FEATURES OF INSTALLATION

1—Handling up to 200 tons per day soda pulp.

2—Reducing density from 8% to 5% in one step.

3—Accuracy within .15% of mean density.

4—Accurately follows variations in volume and density of filter stock.

5—No maintenance expense by its owners to date.

6—Proven reliability and accuracy.

7—Constant pumping conditions.

8—Control of stock for processing and accounting greatly facilitated.

9—Hydraulically operated valve effectively prevents hunting.

10—Will do the same thing in any mill, with any stock, in any volume, and at any regulated density between 2½% and 7%.

MERRITT ENGINEERING & SALES CO. INC. LOCKPORT, N. Y.

Assuming universal use of Standard Accounting Methods and the increasingly valuable knowledge resulting from more and more illuminating questionnaires, the next step would naturally be better understanding of one another's problems, calling for neighborly help in adjustment of local difficulties. New members would naturally hasten to apply for membership in such an organization, operated in *sincerity* for the betterment of the conditions in that territory.

A chain of contented and prosperous local associations making up an even more worthwhile *National Association* could and would command the attention, respect, and consieration of the manufacturing fraternity, far in excess of that which we now enjoy.

Which path shall we travel in 1932—the old, haphazard, drifting one of confusion and chaos? Or the enlightening and profitable one of Confucius and cooperation? Mazzini once said, "Slumber not in the tents of your Fathers. The world is advancing; advance with it."

New Patented Blowpit

The Hauser-Stander Tank Company, of Cincinnati, Ohio, is about to offer to the pulp and paper industry a new patented blowpit of improved construction and economical operation. One of the desirable features in the new blowpit is the elliptical shape. There are also several other new points of design which, combined with the elliptical shape, make it economical to replace present rectangular and cylindrical pits with this new type blowpit. Some of the advantages of the new blowpit are as follows:

Blowpits for new mills—Most economical use of available drainage area; A uniform distribution of pulp over the bottom of the pit; More rapid draining due to uniform depth of pulp; Less washing time required and quicker emptying of pit; also in the case of mills desiring to control and increase the strength of waste liquor for evaporating purposes or other reasons; A stronger and more uniform waste liquor is obtained. *Blowpits for old mills*—With existing installations the substitution of the elliptical pit will affect all the foregoing operating advantages and, in addition, a material reduction in repair and maintenance costs sufficient to warrant the expenditure for a new blowpit.

The improved elliptical blowpit with its devices for economical operation was developed by the Hammermill Paper Company and has been in successful operation in their plant for over two years. The Hauser-Stander Tank Company is placing this new equipment on the market with their approval; and has been granted exclusive manufacturing and sales rights in the United States and Canada on account of its having assisted in the design and development of this new type of pit, and its recognized ability to build these special tanks. The advantages of the improved blowpit have been verified by comparing actual records of the new elliptical blowpit with various type blowpits in operation at the Hammermill plant, Erie, Pa.

S. Sternberg Dies in London

Word has been received here of the death of S. Sternberg, senior partner of S. Sternberg, who died at his residence, London, England, February 4. Mr. Sternberg was well known in the United States, having made a number of trips to this country, to introduce the Fourdrinier wires manufactured by his firm. He had many friends in the paper trade, all of whom are very sorry to learn of his death.

Paper Stock Dealers' Banquet

One of the most enjoyable events of paper week was the twenty-fourth annual banquet of the New York Association of Dealers in Paper Mills Supplies, Inc., which was held at the Hotel Commodore, New York, on Wednesday evening, February 17. There was a large and enthusiastic attendance of members and their invited guests, who sat down to an excellent menu, and enjoyed a varied and diversified entertainment.

Tables were reserved by the following: Sol Ash, Inc.; Atterbury Bros.; D. Benedetto, Inc.; Robert Blank, Inc.; A. Bloch & Co.; C. F. Bradley; F. Cantasano, P. Cardinale & Son; J. H. Carlo & Co.; Jas. Carrano & Son; Darmstadt, Scott & Courtney; A. Donafrio; Economy Baler Company; Gaccione Bros. & Co.; Giove, D'Arecca & Co.; Hicks, Costarino & Co., Inc.; Daniel M. Hicks, Inc.; Gus A. Johnson, Inc.; E. J. Keller & Co.; L. Leonardis; Leshner Paper Stock Company; Melrose Paper Stock Company; Geo. W. Millar & Co., Inc.; A. J. Moran & Co., Inc.; National Association of Waste Material Dealers; Philadelphia Waste Paper Merchants Association; W. Steck & Co.; Sterling Mill Supply Company; Valva Paper Stock Company, and Wilson Paper Stock Company.

The following committee was responsible for the success of the banquet: Andy C. Costarino, president; Walter H. Martens, Charles Passannante, Alfred J. Moran, Joseph Carrano, Louis Gottlieb, Fred H. Chase, Louis Leonardis, Anthony F. Carlo and Lawrence W. Giove.

General Butler to Address Waste Association

Major General Smedley D. Butler, whose spectacular career for more than thirty years in the United States Marines is well known, has accepted an invitation to address the members of the National Association of Waste Material Dealers and their guests at that association's Nineteenth Annual Banquet, to be held at the Hotel Astor, New York, on the evening of March 16. General Butler is always interesting because he has interesting things to say and says them in an unusual way.

His experience as Head of the Police Department for two years in Philadelphia and his experience of over thirty years with the Marines assures a very interesting address for the members of the above association. It was Lowell Thomas who characterized him as a "stick of human dynamite" and with conditions as they are at present in the Far East, the General is likely to step right out and call a spade a spade.

The Banquet Committee having charge of the affair announce that advance reservations indicate a very large attendance.

William Harvey Eaton Dead

William Harvey Eaton, aged 85 years, for many years Vice President and Treasurer of the Eaton-Dikeman Company, died February 7 at his home, Lee, Mass. He was born in Springfield son of William and Asenath (Hitchcock) Eaton. When about 20 years of age he went to New Haven, Conn. to enter the papermaking business. In 1891 he removed to Lee and became connected with the Eaton-Dikeman Paper Company where he was actively engaged up to about two weeks ago.

Mr. Eaton married in 1868 Miss Cornelia M. Hollister of Springfield. Previously he had seen service in the civil war enlisting as a drummer boy when only 16 years old. When insurance week was observed recently by Massachusetts companies Mr. Eaton was found to have the oldest insurance policy in the state it having been in force 65 years.

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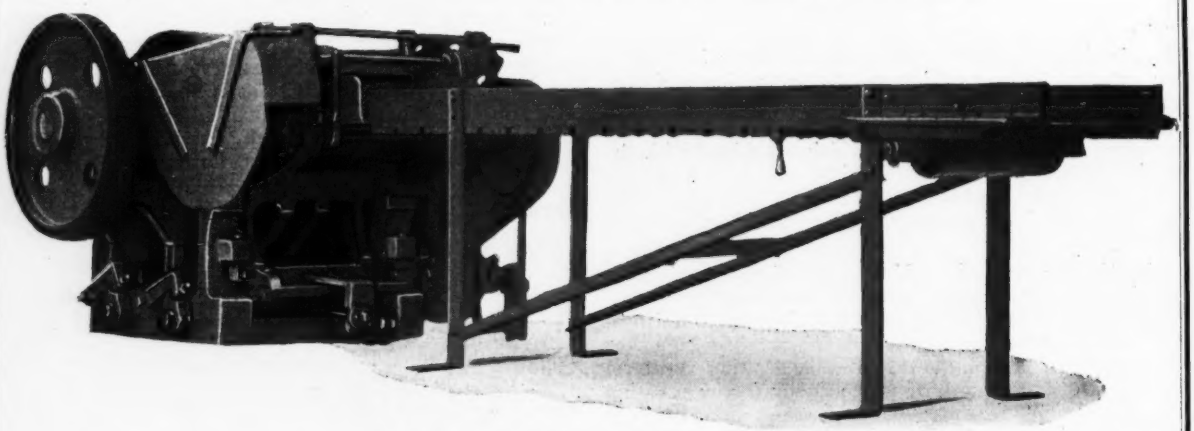

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Technical Association Holds 17th Convention

Allen Abrams, of the Marathon Paper Mills Co., Is Elected President—Association Has Successful Year, Reaching New High Peak in Membership—New Territorial Sections Are Organized and New Divisions and Committees Show Active Interest

THE Technical Association of the Pulp and Paper Industry held its seventeenth Annual Convention at the Hotel Pennsylvania, New York, on Tuesday, Wednesday and Thursday of this week. The meetings were as usual well attended by representative technical men from all the paper making sections of this country as well as Canada.

The President's Address

The retiring president M. A. Krimmel of the Hammermill Paper Company, Erie, Pa., presented his annual address as follows:—

While it may be appropriate and I know it is customary to include a resume of activities, accomplishments and developments of the past year in this item of the program; I feel that, as we are organized and functioning now, this is not necessary and can hardly be done without considerable duplication. However, it is not my intention to give the impression that I consider our accomplishments of minor importance. All of our activities including committee work, meetings, papers, discussions, fall meetings, sections, cooperative work with the other societies and associations are reported and recorded in the Technical Section of PAPER TRADE JOURNAL and in *Technical Association Papers,* as are also reports covering new developments in the industry which are presented annually under the Divisional Organization Plan. Nevertheless, some of our activities must be mentioned in presenting the affairs of the Association and I also consider it my duty to call your attention to some of our problems.

The Divisional Plan

Our divisional plan which was devised to place our committees and their work on a more efficient basis, to classify and satisfy the interests of all members, and to provide ample opportunity to serve by participating in committee work; has been in operation for a little over a year. It is such a comprehensive plan that all phases of it are not as yet being utilized but the results to date show that it has produced a desirable effect in many ways. Annual meetings especially are better organized. Programs are more definite. More members have an opportunity to share in activities and responsibility. The Association is kept in closer touch with new developments. Committee work is better coordinated with less duplication of effort. Each committee has a well defined field of activity. In fact committee work, long recognized as the backbone of our Association is considerably strengthened by the divisional organization. The Technical Association has grown and developed with technical developments in the pulp and paper industry from a small and simple organization into a rather complex affair. It should never be considered as a business concern although the volume of business from a financial standpoint is far from insignificant. Yet the affairs of the Association should be governed by sound business principles.

New Articles of Organization

Last year your attention was called to the part that TAPPI had outgrown its Articles of Organization. Your Executive Committee considered them inadequate for the needs of today and set themselves to the task of revising these Articles keeping in mind not only present but also future requirements, trying to incorporate principles of good business, and trying to preserve as much as possible the basic intention of the founders of the Association who were largely responsible for the original document. This required a great deal of time but we feel that our efforts have produced Articles of Organization that will serve well and adequately as definitions of Tappi; and as the controlling elements in conducting the affairs of the Association. We hope you have given the revised articles your careful consideration. They were approved tentatively at the Fall Meeting at Kalamazoo, Mich., and will be submitted for adoption or rejection at this meeting.

ALLEN ABRAMS, PRESIDENT

During the past year charters were granted to two sections which have been properly installed and which are now actively functioning. This brings our total number of local sections to four. Interest in this form of activity is evident in some other localities which we hope will develop into action. The good work being done by existing sections is encouraging and assures us that sections are assets to TAPPI. Through sections the Association can widen its activities, spread its influence, increase its membership and better serve its members.

Advantages of Sections

One of the biggest advantages of having sections throughout the country is that two problems in connection with fall meetings will be eliminated. It is always difficult to decide upon a place for these meetings because there are no definite policies in this respect and because invitations must often be solicited. With properly distributed sections it should be possible to plan a system whereby sections would

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act as hosts for the Fall meetings according to a rotating schedule which would cover all parts of the country and thus be fair to members of all localities.

Since arrangements are usually placed in the hands of a local committee considerable organizing must be done; but if the meetings were held in localities where there are sections this would not be necessary as the local group is already organized. The Kalamazoo Valley Section with headquarters at Kalamazoo, Mich., was host at the meeting this Fall and the success of this very good meeting was due largely to the fact that this group was organized and that they had previous experience along this line.

Publishing Problems

The increase in Technical articles resulting from expansion of technical activities in recent years has precipitated publication problems some of which have been at least temporarily solved during the past year. I am sure those of you who are interested in abstracts have noted that successful attempts were made to bring them up to date and that this status is being maintained. In order to keep the Technical Section of PAPER TRADE JOURNAL open for articles as they are submitted, papers for the annual meeting have been published in advance, and will therefore not be congesting our publishing space for months afterward. While this may prove to be unsatisfactory we have the assurance of the Lockwood Trade Journal Company that it will assist us by providing adequate space for our Technical articles. The ever-cooperative spirit and attitude of this company is greatly appreciated.

Publication of the TAPPI Manual, upon which work was started a year ago, presents another problem. It involves an enormous amount of work but I hope that all of those who are participating in the collection, compilation, and preparation of data and material for it will make efforts to hasten the completion of it because the demand for the Manual is great and it will be a valuable addition to TAPPI's accomplishments.

Pulp Specifications

Last May a group of members who are consumers of pulp expressed a desire to have something done about pulp specifications. This is a defined activity of our Fibrous Raw Materials Committee and a sub-committee of it was appointed to work on this project. Since specifications must be based on qualities and properties, the progress of this committee will hinge upon the work of the Pulp Testing Committee. It seems not only desirable but also essential to give more assistance to the members who have been struggling so hard with this difficult pulp testing problem. The development of standard methods and specifications is a logical TAPPI activity. We are well organized and equipped for it but more time must be spent on such things if we are to make progress that will satisfy the demand. I appeal to those who can assist in such work and who are not yet connected with it to offer their services.

Despite much that has been said to the contrary, the Century of Progress scheduled to be held in 1933 at Chicago will materialize. We plan to hold our 1933 Fall Meeting there. A special committee headed by Allen Abrams has planned an excellent exhibit to depict general as well as technical progress in the pulp and paper industry. While such an exhibit should be sponsored by the American Paper and Pulp Association, no definite action has been taken along this line as yet. It does seem that an industry such as ours should be represented. We have made so much progress along technical lines during the past century that we are more than justified in "telling it to the world." We should try to find some way to accomplish this.

Research Activities

Last year I spoke about the need of trained men and research for our industry and outlined what TAPPI had done along educational lines and in encouraging and supporting research. That we have been actively engaged in training men in the industry and sponsoring research jointly with other associations for a number of years bears repetition. Conditions of today justify not only the continuation but also an extention of this program. It is gratifying to note that in this depression most industrial concerns have increased rather than decreased research which is evidence of their faith in it but more likely of their belief that research is an investment to safeguard the future.

Our industry needs more research and more men highly trained to do research work and to apply the results of it. The Paper Institute at Lawrence College, was established as you all know to provide trained men for the industry. On this basis and because of our policy to encourage training of men, it has received our financial as well as moral support and this should be continued for I am sure we all want TAPPI to be actively connected and identified with such a worth while project.

The research fellowship at the Forest Products Laboratory which we are sponsoring in conjunction with the American Paper and Pulp Association has yielded results of great practical value to the industry. Mr. Doughty, the holder of this Fellowship will present his third report on his work at this meeting. I believe we can conclude from this that research work of this type is of sufficient value to the industry to justify the expenditure of more Association money for such purposes.

Successful Year for TAPPI

Considering the poor economic condition of the past year especially we have had a good year in TAPPI. Under the circumstances it was really a remarkable year. Because of the way we are organized Association work is bound to lag during depressions and yet we have accomplished a great deal of which we can well feel proud. TAPPI has weathered the storm in fine shape. Naturally there were resignations but there were also new members admitted and we can actually show a slight increase in membership. As might be expected our income was lower and expenditures higher than in 1930 due largely to business conditions and this would of course affect profits, which however, were only 15 per cent less. In spite of this TAPPI is in a sound financial condition. All of this reflects great credit upon every member of the Association especially on those who have participated actively in its affairs. On behalf of the members of the Executive Committee I thank all those who have contributed in any way to a most successful TAPPI year and I know you will permit me to thank Secretary Macdonald and the members of the executive committee on your behalf for the splendid service they have rendered.

Report of the Secretary-Treasurer

R. G. Macdonald, secretary-treasurer of the association presented the annual report as follows:

The Technical Association of the Pulp and Paper Industry can look to 1931 as one of the greatest in its history, a new high mark in membership being reached and a general increase in the association committee activities.

Membership

In 1931 there were 146 new members elected and 116 resigned or were dropped. On December 31, 1931 the total individual membership was 1196, of which there were 751 active, 315 associates, and 130 juniors. There were 3 corporate members added to the roster and 9 companies became contributing members. The corporate membership was 85 and the contributing membership was 48.

The association regrets that it has lost through death, the following members: T. A. Cape, R. M. De Cew, E. P. Cameron, T. H. Savery, Carlo Moriondi, G. E. Norton, A. E. Sjoman, S. C. Zabriskie, A. F. McCoy, Ivan Rehn, E. J. Owens, J. A. Hedgcock, W. B. Lewis, O. F. Bryant and L. E. Jonte.

The corporate members that joined the Technical Association in 1931 were:

Oxford Paper Company

Oxford Super Calender Book
Oxford English Finish Book
Oxford Rotogravure
Oxford Lithograph
Oxford Offset
Oxford White Seal
Oxford Polar Coated
Oxford North Star Coated
Oxford Dull Finish Coated
Oxford Folding Coated
Oxford Mainefold Coated
Oxford Coated One Side Lithograph
Oxford Miami English Finish
Oxford Miami Standard Super

Mills at

RUMFORD, MAINE, and WEST CARROLLTON, OHIO

Executive Offices:

230 PARK AVENUE, NEW YORK

Western Office - 35 EAST WACKER DRIVE, CHICAGO, ILL.

Westfield River Paper Company, Russell, Mass.
Svenska Cellulose A/B, Stockholm, Sweden
Clyde Paper Mills Ltd., Rutherglen, Scotland
The contributing members added in 1931 were:
Carthage Machine Company, Carthage, N. Y.
Fred S. Carver, New York, N. Y.
Crane Company, Chicago, Ill.
Freeport Sulphur Company, New York, N. Y.
Maine Electric Company, Portland, Maine.
Penick and Ford Sales Company, New York, N. Y.
United States Testing Company, Hoboken, N. J.
Vacuum Oil Company, New York, N. Y.
Wallace & Tiernan Company, Inc., Newark, N. J.
The other contributing members include:
Allen-Sherman-Hoff, 225 S. 15 Street, Philadelphia, Pa.
Bausch & Lomb Optical Company, Rochester, N. Y.
Beloit Iron Works, Beloit, Wis.
Black-Clawson Company, Hamilton, Ohio.
John W. Bolton & Sons, Inc., Lawrence, Mass.
Wm. Cabble Excelsior Wire Manufacturing Company, 80 Ainslie Street, Brooklyn, N. Y.
Cameron Machine Company, 61 Poplar Street, Brooklyn, N. Y.
Carthage Machine Company, Carthage, N. Y.
Fred S. Carver, 345 Hudson Street, New York, N. Y.
Crane Company, 23 W. 44th Street, New York, N. Y.
Crucible Steel Company of America, 405 Lexington Ave., New York, N. Y.
Dilts Machine Company, Fulton, N. Y.
The Dorr Company, Inc., 247 Park Avenue, New York, N. Y.
Downingtown Manufacturing Company, Downingtown, Pa.
Eastwood Corporation, Belleville, N. J.
Edgar Bros. Company, 50 Church St., New York.
English China Clays Sales Corporation, 551 Fifth Avenue, New York, N. Y.
Filtration Engineers, Inc., Newark, N. J.
Fitchburg Duck Mills, Fitchburg, Mass.
Foreign Paper Mills, 314 Broadway, New York, N. Y.
The Foxboro Company, Foxboro, Mass.
Freeport Sulphur Company, 122 E. 42nd St., New York, N. Y.
M. Gottesman & Co., Central Natl. Bank Bldg., Broadway and 40th St., New York, N. Y.
Huron Milling Company, 9 Park Place, New York, N. Y.
F. C. Huyck & Sons, Albany, N. Y.
International Pulp Bleaching Corporation, 200 Fifth Ave., New York.
International Nickel Co., 67 Wall St., New York, N. Y.
E. D. Jones & Sons Company, Pittsfield, Mass.
Lagerloef Trading Company, 52 Vanderbilt Ave., New York, N. Y.
Samuel M. Langston Company, Camden, N. J.
Lindsay Wire Weaving Company, 14025 Aspinwall Avenue, N. E. Cleveland, Ohio.
Maine Electric Co., 19 Commerce Street, Portland, Me.
Midwest Fulton Machine Company, Dayton, Ohio.
Minton Vacuum Dryer Corporation, Smith Building, Greenwich, Conn.
Moore and White Company, Philadelphia, Pa.
Noble and Wood Machine Company, Hoosick Falls, N. Y.
The Norton Co., Worcester, Mass.
Paper Makers Chemical Corporation, Kalamazoo, Mich.
Penick & Ford Sales Co., 420 Lexington Ave., New York, N. Y.
Pusey & Jones Corporation, Wilmington, Del.
Staley Sales Corporation, Decatur, Ill.
Standard Oil Company (of Indiana), Chicago, Ill.
Texas Gulf Sulphur Company, 75 E. 45th St., New York, N. Y.
The Texas Company, 135 E. 42nd St., New York, N. Y.
United States Testing Company, 1415 Park Ave., Hoboken, N. J.
Vacuum Oil Company, 61 Broadway, New York, N. Y.
R. T. Vanderbilt Co., 230 Park Avenue, New York, N. Y.
Wallace & Tiernan Company, Inc., Newark, N. J.
Walworth Co., 60 East 42nd St., New York, N. Y.
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

.... RONALD G. MACDONALD, SECRETARY

Special Reports

The association exists to a considerable extent, as a clearing house for technical information. Any member having a manufacturing problem can expect to obtain valuable information contributing toward its solution by presenting the problem before the membership in the form of a special inquiry.

A very large number of individuals and companies avail themselves of this opportunity each year. Of such inquiries the majority can be taken care of by the Secretary, who has a great amount of information in his office or can obtain it quickly from well informed and competent sources. When, however, the nature of the problem presented is such that the opinions of a large number are desirable the inquiry is presented to the entire membership and published in the Paper Trade Journal so that all who are interested may contribute the record of their experience. All who contribute such information as well as the corporate members receive the special reports made by compiling the replies received. The association has received considerable commendation for its special reports since the information contained within them usually assists considerably in solving the problems, which in most cases are problems common to a considerable number of companies. Following are the titles of the Special Reports issued in 1931:

1. No. 151—Sulphur Burner design.

-if it's a

QUESTION

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COLOR
FINISH
QUALITY
SERVICE
FOLDING
FORMATION
SUBSTANCE
UNIFORMITY

in All-Rag or Rag-content Papers or Bristols

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2. No. 152—Sulphate Black Liquor Soap Disposal
3. No. 153—Odor in Kraft
4. No. 154—Deinking Operating Factors
5. No. 155—Silicate of Soda in Box Board Cuttings
6. No. 156—Chlorination and other Methods of Slime Control
7. No. 157—Initial Strength Testing of Wood Pulp
8. No. 158—Hydrogen Ion Equipment and Control
9. No. 159—Sheet Formation on Cylinder Machines
10. No. 160—Drives for Top Press Roll on Cylinder Presses
11. No. 161—Groundwood Sheet Dust
12. No. 162—Curling of Paper Board
13. No. 163—Cylinder Machine Sheet Formation
14. No. 164—Asbestos Drier Felts vs Cotton Drier Felts
15. No. 165—Opaque Mitscherlich Sulphite Paper
16. No. 166—Cleaning Fourdrinier Wires

Fall Meeting

The fall meeting of the Technical Association was held at Kalamazoo, Michigan, on September 24-26, 1931. About 250 attended. The local committee under the able chairmanship of Ralph Hayward, vice-president and general manager of the Kalamazoo Vegetable Parchment Company, provided one of the best fall meetings that the association has held. A report of the meeting appeared in the various trade journals of the industry immediately following the meeting.

Articles of Organization

During the past year much time was devoted by the executive committee to a study of the articles of organization of the association. The last time the articles were seriously changed was in 1923. Since the association has grown considerably in the interim and has broadened its scope of interest greatly it became evident that many changes should be made in the articles to bring them up to date. The entire set of articles were therefore rewritten and read at the Kalamazoo meeting. A copy of the rewritten articles was sent to each member of the association in January and they will be voted on at the annual meeting.

Employment

One of the principal activities of the Secretary's office during the past year has been to find positions for mill superintendents, engineers and chemists. The companies of the industry have co-operated excellently in notifying the Secretary of positions open. A very large number of positions were filled in this way and very few members had to remain unemployed for any considerable period. Unfortunately a few very compentent members had to endure an unreasonably long period of inactivity. There are a few members in this status at present, but every effort is being made to enable them to return to the industry. It has been particularly gratifying to note the increasing number of companies that request Technical Association members for positions as superintendents and mill managers.

Publications

The PAPER TRADE JOURNAL was the official publication medium of the association in 1931. Through the generosity of Mr. George S. Macdonald, owner of the Lockwood Trade Journal Company, the Technical Association Section of the PAPER TRADE JOURNAL was increased from ten to twelve pages weekly. This enabled the association to publish four pages of abstracts weekly, a sufficient number to assure keeping them up to date.

The bibliography of paper making for 1931 will not be published in the PAPER TRADE JOURNAL nor in Technical Association Papers this year, but will appear as a separate publication sent to association members. With the bibliography will appear the list of U. S. patents issued in 1931.

The Lockwood Trade Journal Company has furthermore been generous in supplying preprints of the papers presented at association meetings, and in contributing financially to the publication of Technical Association Papers. Mr. Henry J. Berger, editor of the PAPER TRADE JOURNAL has given unstintingly of his time and efforts to enable the association's publications to appear in their most useful and presentable form.

The cover stock of Technical Association Papers, Series XIV, was kindly donated by the Bogalusa Paper Company. The books published for the association by the Lockwood Trade Journal Company, namely Paper Testing Methods, Chemistry of the Sulphite Process, Papermaking Materials, and the Bibliography of Paper Making are still in demand and a copy of each book should be in every technical man's library.

Cooperative Activities

The Technical Association continued to financially support a joint fellowship with the A. P. P. A. at the Forest Products Laboratory, Madison, Wisconsin. The work of the fellow, Randall H. Doughty, deals with a study of the relationship between fiber properties and sheet properties.

The association made a substantial financial contribution to the Institute of Paper Chemistry at Appleton, Wis.

The association has participated with a number of other professional societies in the formation of an "Inter-Society Color Council." It has been represented at the first meetings, held in New York, by P. F. Wehmer of the Electrical Testing Laboratories and E. A. Bergholtz of the American Telephone and Telegraph Company laboratories.

The association was represented at the "Third International Fuel Conference" at Pittsburgh, Pennsylvania, by M. H. Teaze of Hardy S. Ferguson & Co.

J. D. Miller of the York Haven Paper Company represents the association as a member of the A. S. T. M. committee A-10 on iron-chromium, iron-chromium-nickel and related alloys. C. E. Libby of the New York State College of Forestry represents the association on A. S. T. M. committee D-8 on bituminous waterproofing and roofing materials.

The association continues to be represented on the joint educational committee with the A. P. P. A. and A. P. P. M. S. A., the joint textbook committee with the Canadian Pulp and Paper Association, the joint committee on approved pulp testing chemists with the A. P. P. A. and A. A. W. P. I. Many of the association members are active in the work of other professional societies.

Kalamazoo Valley Section

During the summer of 1931 a charter was granted to the Kalamazoo Valley Section of TAPPI. This body has been functioning successfully for a few years as the Paper Technologists Club. One of its first major accomplishments as a section was the sponsoring of an excellent national fall meeting for the association. The surplus funds remaining from the convention were placed in trust as an educational loan fund to assist students in colleges preparing for the paper industry. The first officers of the section were M. D. Bardeen, chairman; W. K. Kidder, vice chairman; and H. R. Miller, secretary-treasurer.

Delaware Valley Section

The members of the association located in Eastern Pennsylvania, New Jersey and Delaware met in the spring of 1931 to discuss the formation of a local section. The section formally organized in October, and received its charter in November, 1931. The first officers include W. R. Maull, chairman; G. E. Landt, vice chairman; H. P. Cannon, secretary-treasurer. J. H. Hazelwood and C. W. Rivise, executive committeemen. The meetings are held monthly and are well attended and enthusiastic.

Pacific Section

The Pacific Section held two meetings during the year. In the spring, the meeting was held at Everett, Washington, and in the fall at Powell River, B. C. The officers until October were C. W. Morden, chairman; I. H. Andrews, vice chairman; and M. W. Black, secretary. At the Powell River meeting R. B.

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Hansen was elected chairman; I. H. Andrews, J. P. V. Fagen and R. J. Schadt, vice chairman and E. G. Drew, secretary.

Lake States Section

The Lake States Section completed a very successful year under the excellent chairmanship of Otto Kress. G. F. Krubecky was vice chairman and R. J. La Roux was secretary-treasurer. Interesting monthly meetings have been held in most of which meetings two papers were presented.

The presence of the Institute of Paper Chemistry at Appleton, Wisconsin has attracted a large number of technical experts from the allied industries. These men have, incidental to their visits to the Institute, been guest speakers at the regular meetings of the section.

In general it may be said that all of the association sections are in good condition and have a very high type of leadership which assures their success for many years to come.

Divisions and Committees

The new divisional plan of organization of the association functioned quite well during the past year. The field of activity of each division and committee has been well defined and most of the committees have enthusiastic and capable chairmen. The coming year should see the committees personnel strengthened considerably and more committees with definite annual objectives.

The education committee has been making a joint investigation with Federal Board of Vocational Education of the job training problems of the industry. The Federal Board has turned over to the association the services of its staff who have made visits to mills to gather the desired information.

The pulp testing committee presented the Genberg-Laymon method to the membership for vote but the method was not adopted by the association. At this annual meeting a tentative standard method of forming and testing of pulp sheets will be discussed.

The paper testing committee presented methods for determining bulk and opacity to the membership. Both methods were adopted by the association as official standard methods.

The non-fibrous materials testing committee has presented a number of tentative official standard methods to the association for consideration. Mr. Griffin's interest in this work has been very commendable.

The waste committee presented a method for measuring, sampling and testing of white water for association vote. This method was adopted as an official standard by the association.

The next few years should see a marked improvement in the committee work, particularly when the committee personnel has become more stabilized than it is at present. Many of the committees have announced definite objectives for the coming year and with personnel changing to a less degree than in former years, more definite accomplishments may be expected.

The secretary is indebted to a considerable number of members for assistance relative to giving service to members. Particular appreciation must be made of the co-operation of B. W. Scribner, C. E. Curran, R. C. Griffin, D. E. Cable, W. G. MacNaughton, C. M. Baker, and F. C. Clark. The spirit of co-operation in the association is one of its fine characteristics. The secretary has never failed to obtain co-operation from a member on any request made.

Research on Lithographic Paper Makes Progress

R. F. Reed, director, Department of Lithographic Research, Lithographic Technical Foundation, and chairman of the advisory committee to the Bureau of Standards on standardization of lithographic papers, reports progress in the cooperative research on lithographic papers.

This research was begun in July, 1930, as a joint project of the U. S. Bureau of Standards and the Lithographic Technical Foundation. The progress made in this work during the past year was reviewed in reports presented before a meeting of the advisory committee at the Bureau of Standards, December 1, 1931. During 1931 laboratory tests were conducted at the Bureau and plant studies were made in the plant of the American Lithographic Company at Buffalo. The results of this work were reported in detail and, after discussion, a tentative program for the coming year was adopted.

Seventeen important factors which influence the closeness of register have been definitely determined and studied. The data obtained were considered by the committee to be sufficiently conclusive to warrant a publication on the control of register on the offset press. The recommendations include the following:

1. The shipment of paper with a moisture content that will reduce conditioning time in the lithographic plant.
2. Use of the new paper hygroscope, developed by the research laboratory of the Lithographic Technical Foundation, by the lithographer for checking the moisture content of the paper with reference to that of the plant atmosphere.
3. Thorough conditioning of paper in the pressroom atmosphere as soon as wrappers are removed, to prevent wrinkling.
4. Standardization of printing plates with respect to thickness.
5. The use of an accurate ruler as a means of determining the length of impression in relation to the length of the plate design on the first printing of a multi-color job. Accurate knowledge of this relation was found to be of extreme importance in maintaining register.
6. Accuracy in the location of register marks.

In addition to the operating factors, the following paper factors and their effect on the maintenance of register were studied, using papers of known history:

1. Effect of the degree of beating and jordanning.
2. Effect of the degree of beater sizing.
3. Effect of surface sizing.

The study of the effects of beating and jordanning and of beater sizing was carried out with both coated and machine-finished papers. While definite indications were obtained in the study of the various papers, recommendations will have to await the results of further experiments.

Much of this work has been made possible through the generosity of interested individuals and firms in the industry. Credit is due to the American Lithographic Company for the use of its Buffalo plant and for the helpful cooperation of its executives and employees, and to the Lowe Paper Company for generously contributing the services of Dr. R. M. Cobb as temporary research associate to conduct the plant studies. The industry is greatly indebted to Miss Cobb for her unusual interest and untiring efforts, which made possible the accomplishment of a large amount of work in a limited time. Credit is also due the Dill & Collins Company, the Rex Paper Company, and the West Virginia Pulp and Paper Company for their assistance in preparing special samples of paper to be used in this work.

Technical Association Officers

The Technical Association of the Pulp and Paper Industries elected the following officers:

President, Allan Abrams, Marathon Paper Mills Company, Rothschild, Wis.; Vice-President, C. C. Heritage, Oxford Paper Company, Rumford, Me.; Secretary-Treasurer, R. G. Macdonald, 370 Lexington avenue, New York.

Executive Committee; Allen Abrams, chairman; C. C. Heritage; M. A. Krimmel, Hammermill Paper Company, Erie, Pa.; G. S. Holmes, Brown Paper Mill Company, West Monroe, La.; R. A. Hayward, Kalamazoo Vegetable Parchment Paper Company, Parchment, Mich.; W. S. Kidd, E. B. Eddy Company, Ltd., Hull, Que.; B. T. Larrabee, Pulp Division, Weyerhaeuser Timber Company, Longview, Wash.; G. N. Collins, International Paper Company, New York; W. O. Johnson, Strathmore Paper Company, Woronoco, Mass.; J. H. Slater, Escanaba Paper Company, Escanaba, Mich.; J. F. Rhoades, Mead Corporation, Chillicothe, Ohio; R. G. Macdonald, New York.

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Equipment Developments in 1931*

Part I—General Paper Machinery

Edited by E. F. Bearce[1] and R. G. Macdonald[2]

The advance made in the design and application of equipment to a large extent measures the technical progress of the pulp and paper industry. It is one of the purposes of the equipment committee of the Technical Association of the Pulp and Paper Industry to keep the industry acquainted with new developments in the equipment field.

To this end the equipment committee is made up largely of representatives of companies that are equipment company members of the Technical Association. At the end of 1931 each member of the committee was requested to report the advances made relative to the type of equipment with which he was most familiar. It is not the purpose of this report, however, to advertise the wares of the various manufacturers. On the other hand it must be recognized that the most accurate description of equipment may be expected to come from the builders. The report this year will cover developments that may not be entirely new in 1931 but since this report will serve as a basis for future reports outlining annual developments, the contents herein can be justified. It is also true that there are many developments that will not be reported. Some of these will be described in greater detail in other papers presented at the annual meeting of the association. The authors would furthermore be very glad to have brought to their attention such developments as do not appear in this report so that a supplement to this report may, if necessary, be prepared.

Hydrating Equipment

There have been one or two machines designed on the attrition mill or colloid mill principle. The existing patent situation makes it inadvisable at this time to indicate the manufacturer's names or to further describe the equipment.

The "Stock-Maker" made by the Morden Machines Company, Portland, Oregon, will be described in a paper by C. W. Morden at the TAPPI annual meeting. Briefly it has the appearance of a jordan and has a movable shell which permits variation of space between the plug and shell in such a way as to provide accurate control. Stock is run into the machine in batches and is refined until it reached a predetermined freeness and strength. It is then dropped into a tank and another batch replaces it.

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.
Contribution of TAPPI equipment committee.

[1] Chairman TAPPI equipment committee, vice president and chief engineer, Chillicothe Paper Company, Chillicothe, Ohio.

[2] Secretary, Technical Association of the Pulp and Paper Industry, New York.

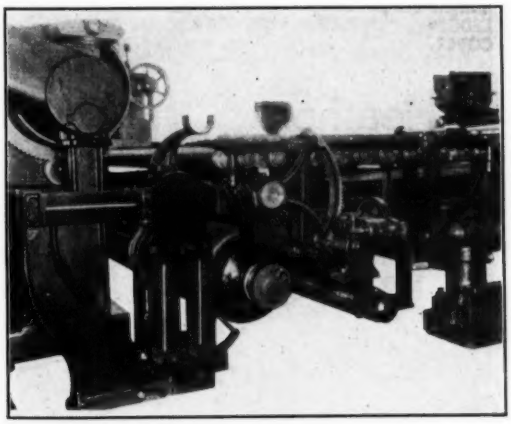

FIG. 2
Front View—Mechanical Handling Device for Breast Roll Removable Fourdrinier (Breast Roll in Removing Position).

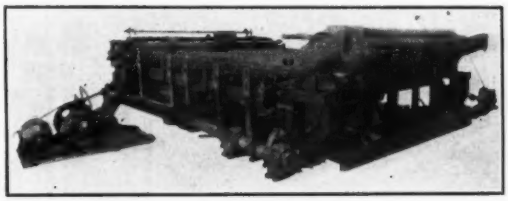

FIG. 1
Rear View—Removable Fourdrinier High Speed Super-Shake with One Shake Head.

The Sulphite Process

Considerable attention is being focused on rapid circulation of liquor in sulphite digesters. Until recently the development of such equipment has been held back by the unavailability of adequate materials of construction. The development of chromium-nickel steels now makes forced circulation systems possible. One system provides for external circulation of the liquor through a pump and piping. The others provide for external circulation and beating as well. These systems are sold by the Chemipulp Process Inc., Watertown, N. Y. (Hovey System), the G. D. Jenssen Company, 405 Lexington avenue, New York, (Jenssen-Brobeck System), and the Fibre Making Processes Inc., 2 South Michigan Boulevard, Chicago, Ill. (F. M. P. System). The latter system is now being installed at the Rhinelander Paper Company, Rhinelander, Wis.

The use of carbon blocks for digester lining appears to have been successful in a number of trial installations. The National Carbon Company of Cleveland, Ohio, has done much of the pioneer work and the Stebbins Engineering and Manufacturing Company has also been interested.

Pulp Screens

The American Paper Machinery and Engineering Works of Glens Falls, N. Y. has brought out a new pulp screen equipped with roller bearings for which numerous advantages are claimed.

Paper Machinery

Representatives of two large machine builders have briefly indicated the outstanding improvements in their machinery.

C. R. Whipple of the Beloit Iron Works, has written as follows:

"One of the outstanding developments this year on the Fourdrinier part is the improved shake arrangement, including a new type of shake head, all of which is illustrated in Fig. 1. The new shake head is what we term a three point shake, arranged to give a balanced motion at all positions of the shake. The new shake head is built very compact, requiring a very small amount of floor space, is arranged with a variable speed motor, mounted on the shake pedestal, all of the moving parts are built to give long and continuous service, the main crank shaft being mounted on anti-friction bearings. The shake is arranged so that the speed and stroke can be varied while the machine is in operation.

"Another very important improvement on the Fourdrinier part in the last year is the new method devised for handling the breast roll when changing the wire on the removable type of Fourdrinier. This method is illustrated in Fig. 2. You will note that the breast roll can be lowered from its operating position to the position illustrated, by means of the back geared mechanism which enables the breast roll to be handled easily without

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disturbing the position of any of the table rolls, savealls, or breast roll doctor.

"This apparatus not only saves a great deal of time and saves handling of these parts, but also eliminates the possibility of stretching the wire more on one side of the machine than the other when bringing the breast roll back into operating position when putting on a new wire because the apparatus is so arranged that the breast roll is always in line with the machine and when it is brought back into operating position the tension on the wire is even the full width of the machine. There is no chance for one end of the breast roll to be moved ahead of the other.

"An improvement in spiral gear drives has been the development of the hypoid drives for paper machine sections such as illustrated in Fig. 3. With this arrangement you will note that the pinion shaft is on a higher plane than the gear shaft permitting the use of anti-friction bearings on both sides of the bevel pinion and also on both sides of the bevel gear insuring positive and permanent alignment of these parts. The use of hypoid drives, also permits larger pulleys on the drives on account of the pinion shaft being located above the gear shaft.

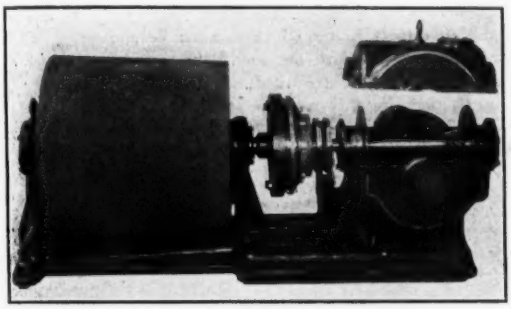

FIG. 3

Beloit Hypoid Spiral Gear Drive—Cut Off Coupling Type with Magnetic Clutch.

This applies especially to cases where the distance to center of the indriving shaft is limited. Furthermore this type of drive permits the pulleys to be mounted on a separate shaft from the pinion shaft which allows the clutch to be located in a convenient and accessible position. In general the hypoid drives, also spiral gear drives, are conceded to be the latest development in mechanical drives for paper machines.

"These drives are all arranged with accurately cut steel gears, totally enclosed, running in oil. All of the bearings are anti-friction type. The clutches are either of the high grade automotive mechanical friction or improved type magnetic clutches, when

FIG. 4

112-inch Book Machine—Rear View Drier Section Showing Chain Drive.

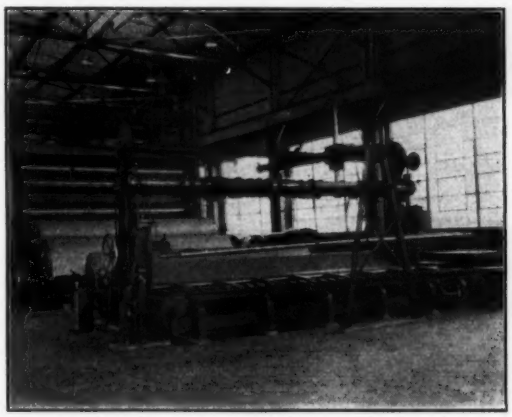

FIG. 5

Winder Showing Shaft Transfer in Operation.

desired. The drives are arranged with electrically operated belt shifters, arranged so that the operator can conveniently control the position of the belts by push buttons from the front side of the machine. Furthermore, the mechanical frictions when so desired may be operated hydraulically, also from the front side of the machine.

"An improvement in condensate remover for driers has been developed; with the new method, the water can be removed from the driers at all speeds, thereby permitting the driers to operate at highest drying efficiency with the least amount of power required to revolve the driers. From a series of tests it has been proven conclusively that driers operating with water accumulated on the inside require more horsepower depending on the depth of the puddle and also the speed at which the machine is operated. Therefore, a great amount of saving is effected in the operation of a paper machine by keeping the amount of water in the driers down to a minimum and this is accomplished most effectively by the new system referred to for removing condensate effectively at all speeds.

"The new type condensate remover can be operated in conjunction with the conventional type of steam connections to the driers or more preferably in connection with the latest improved type of oilless, frictionless and self-adjusting steam joint. The new type steam joint is now being made in several designs, one

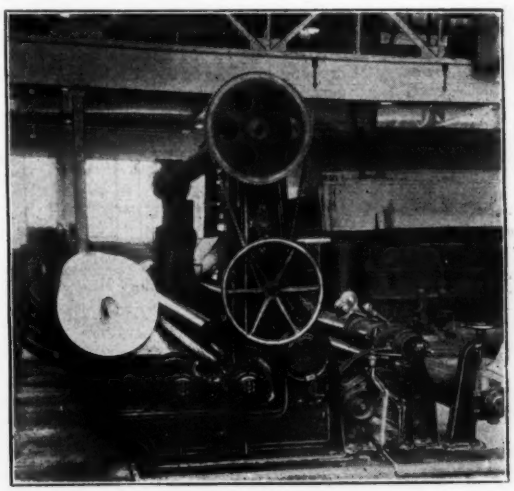

FIG. 6

Improved Winder Showing Roll of Paper Resting on Cradle and Ready To Be Lowered To Floor—Front View.

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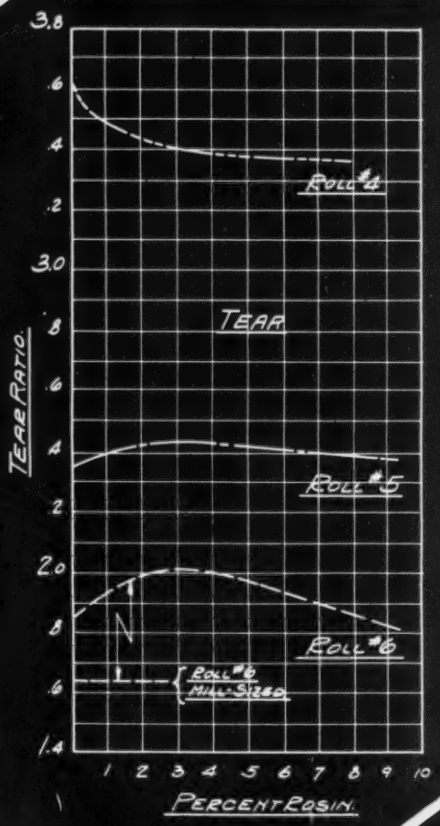
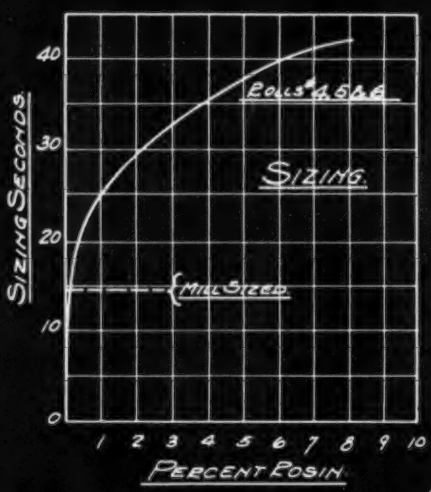
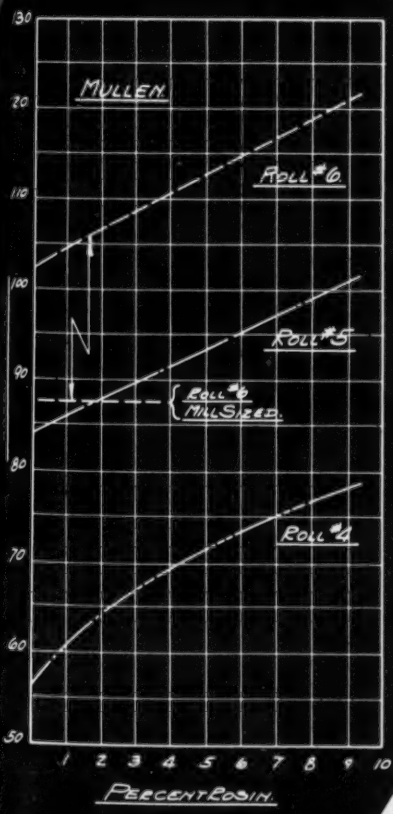
COMPARISON OF MILL SIZING AND SOLVENT SIZING ON KRAFT PAPER







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being particularly adapted to existing driers making a very simple and compact installation. This type is self-supporting from the drier journal and can be applied to the conventional type of paper machine.

"An application of the new type of steam joints in connection with chain drive for driers instead of gears is illustrated in Fig. 4.

"The use of rubber covered suction rolls for paper machines has come into prominence and it has been found that the rubber covered suction press roll has many desirable features. The rubber covered suction roll tends to give longer felt life, also eliminates the possibility of shadow-marking the sheet. The rubber covered suction roll permits the use of a hard surface top roll; in fact, it enables the use of any kind of material desired as a top roll. Some mills have found it desirable to use a rubber covered top roll in connection with the rubber covered suction roll.

"Furthermore, the rubber covered suction roll eliminates the tendency to mark high grade sheets, particularly sheets of paper that have clay loading as the rolls in the rubber cover are smaller than the holes in the ordinary brass shells and the holes in the rubber cover tend to close up at the nip between the top and bottom rolls. By various tests it has been found that the rubber covered suction press rolls are equally as effective in removing the moisture from sheets and felts as the brass rolls as all excess water is removed before the nip.

"Rubber covered suction press rolls are fast coming into prominence and by virtue of the rubber covering their application has become more universal than the plain brass jacketed suction press roll. Furthermore, in regard to the application of suction rolls, it is interesting to note that a great deal of interest has been displayed this year in the use of suction rolls in connection with single cylinder and multi-cylinder machines and it has been demonstrated that they have proven a very important factor in more successful of these machines, thereby resulting in greater production, in more uniform product, also tending to give increased bulk and strength to the sheet.

"Further improvements of automatic unloading type winders are also interesting. Fig. 5 illustrates a new shaft pulling device, particularly desirable for wide machines. With this apparatus in connection with the automatic unloading type of winder illustrated in Fig. 6 the roll of paper is automatically discharged from the winder to a conveyor which in turn pulls the roll of paper off the shaft, the shaft then being returned automatically to the bearings on the winder. With this arrangement it is not necessary to handle the winder shaft by hand. Furthermore this type of apparatus eliminates the use of a crane for handling the rolls of paper as the roll of paper is automatically discharged from the winder and conveyed to the location desired without the use of an overhead hoist for delivering the roll of paper from the machine.

"Another outstanding development is an improved type of equalizing press roll drive. This apparatus is arranged to give a uniform surface speed between the bottom and top press rolls automatically. It does not require any attention from the operator other than to supply the necessary lubrication for the gears which are totally enclosed, running in oil. It is also interesting to note that the bearings in connection with this drive are our latest improved type anti-friction and are so arranged that they are lubricated from the oil within the housings automatically.

"This type of drive has proven to be very beneficial in increasing felt life and tends to give a stronger and more uniform sheet and on heavy weights eliminates the trouble heretofore experienced with checking.

"Several other important improvements are being developed on which we are not in a position to comment at this time but which we know are going to be very beneficial to the trade."

Another report of paper machine developments was received from L. M. Start, secretary of Rice, Barton & Fales, Inc., whose letter we will quote:

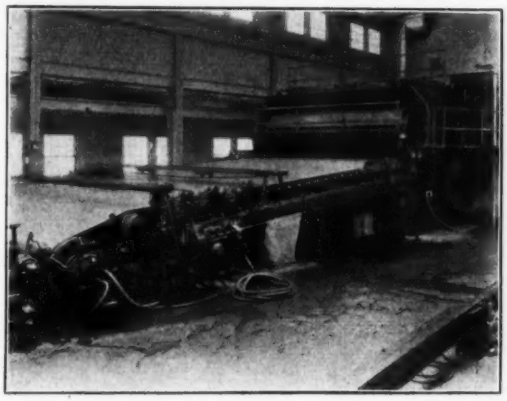

FIG. 7

"Referring again to yours of the 21st, we believe that the outstanding development during 1931, as far as we are concerned, was the two paper machines which we built for the Maine Seaboard Paper Co., Bucksport, Maine.

"These two machines are three-roll news machines with removable Fourdriniers, suction couch roll, oscillating suction boxes. There are only two presses, both being suction; forty-eight (48) 5 ft. driers, stack of calenders, a Pope reel, and a Rice, Barton & Fales slitter and two-drum winder. Every roll which revolves on these two machines is equipped with anti-friction bearings, with the exception of the calender rolls.

"These machines were started some few months ago and the speed has gradually increased until they have operated at a speed of 1300 feet per minute.

"These machines have produced as much as 309 tons of newspaper per day, and so far as we know the machines are equipped with all the modern improvements put on paper machines. There are several interesting features in connection with these machines, and we thought you might be interested in some photographs, which we are inclosing.

"Fig. 7 is the Fourdrinier part, and you will note that it is a very simple type removable and adjustable Fourdrinier.

"Fig. 8 shows the press part, which is very simple in design. There are very few felt rolls and the felts are only 35 feet long.

TABLE 1
POWER DATA FOR MACHINE NO. 1, MAINE SEABOARD PAPER COMPANY, BUCKPORT, ME.

Date	9/11/31	9/11/31	9/11/31	9/11/31
Speed F.P.M.	1125	1125	1130	1135
H.P. Wire	165.9	165.9	161.3	169.5
H.P. 1st Press	41.5	47.9	41.8	41.5
H.P. 2nd Press	41.5	41.5	41.1	41.5
H.P. 1st Driers	19.1	19.1	20.6	20.7
H.P. 2nd Driers	28.7	28.7	27.5	27.1
H.P. 3rd Driers	27.1	25.5	22.8	20.7
H.P. 4th Driers	33.5	30.3	30.1	25.5
H.P. Total Driers	108.5	103.7	100.9	94.1
H.P. Per Drier	2.26	2.16	2.10	1.96
H.P. Calender	143.6	143.6	151.8	143.6
H.P. Reel	20.4	19.8	18.7	16.0
H.P. Total Machine	521.3	515.8	518.8	505.6
H.P. S.W. B.D. Total	523.2	502.4	525.1	497.6
H.P. Per Inch Width	201	193	201	189
Per 100 Ft. Speed				
	Vacuum (inches)			
Couch	15.0	16.0	16.5	16.0
1st Press	20.0	20.0	19.5	20.0
2nd Press	17.0	17.0	17.0	17.5
Flat Boxes	10.0	9.5	9.0	6.7

"Fig. 9 is a photograph of the dry part, taken from the backside, and you will note how accessible the backside is—there is just as much room as on the frontside. We use small drier gears and intermediate gears, all totally inclosed.

"Fig. 10 shows the unwinder and the winder. You will note that the unwinder is equipped with a motor running as a generator where the friction is automatically taken care of. There are no friction straps on this unwinder. The winder is equipped with a device for unloading the rolls of paper. Individual bottom slitters are used, thus eliminating the slitter shaft. These various motors are mounted on cast iron bedplate and can be moved in

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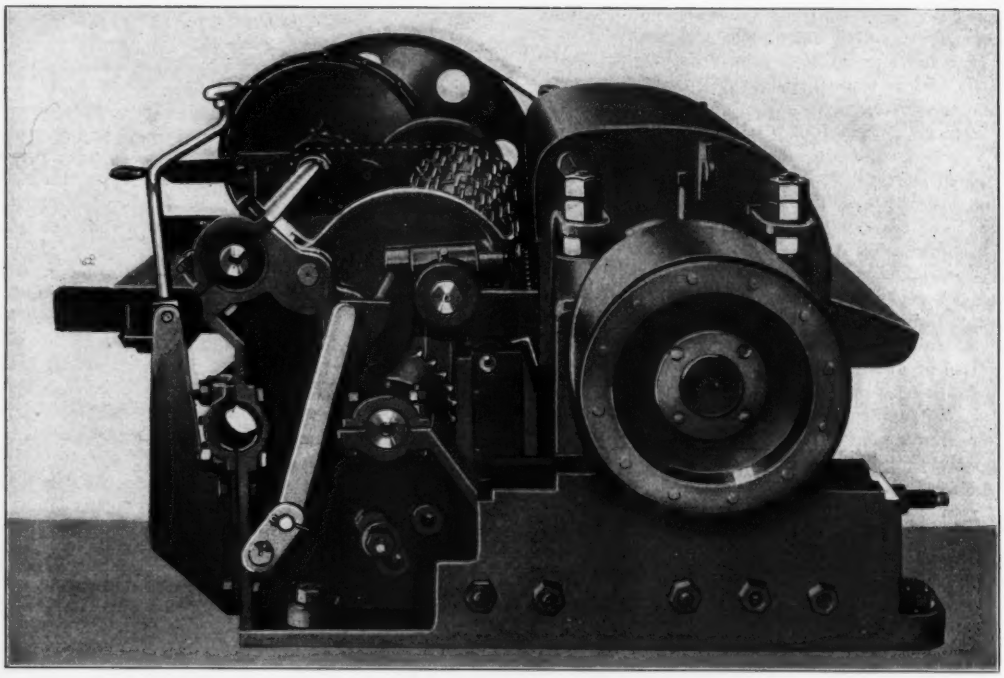

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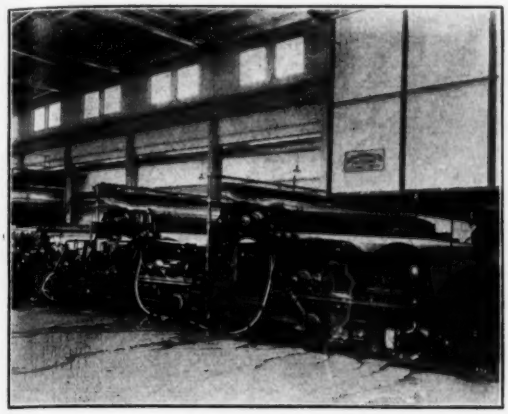

FIG. 8

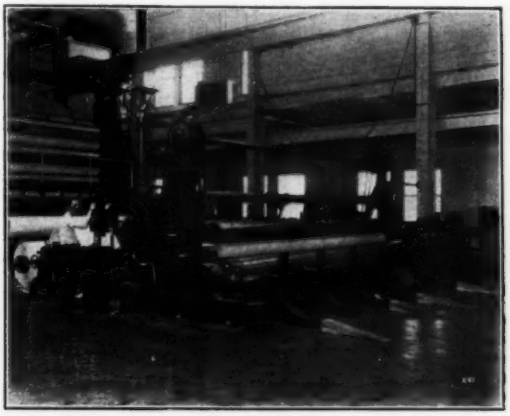

FIG. 10

and out for various trims. You can also take a bottom slitter out without much trouble, as it is fastened and overhung on the end of the motor.

"Thought you might be interested in some horsepower data on these two machines, and we are inclosing data which dates back quite a few months (Table I). It is interesting to note how little horsepower the machines are now taking. To begin with the dry part took quite a bit of power and we found some water in the driers. They have been equipped with a new type of tip which is on the end of the syphon pipe and which keeps them free of water, and immediately the horsepower dropped quite a bit.

"Another interesting development has been in our spiral bevel gear drive. You will note that we are now using a Hypoid spiral bevel gear with the pinion shaft above the center of the gear shaft—this saves quite a bit of room and also enables us to get a bearing on the pinion shaft at either end of the casing. You will also note that these are the cut-off coupling type and not loose pulley drives, and are mounted on a self-contained bedplate with magnetic clutch, making a very fine unit.

"We have also developed a new type of suction box oscillator. It has been rather difficult for us to get any good photographs that would illustrate this, but we (Fig. 11) show one of a machine which we just started up at the Kalamazoo Paper Company. The principle of this new suction box oscillator is as follows: We take the brass cased rail, which is what we call the stationary rail to which the suction boxes are attached, and support these rails on vertical springs—they are supported at either end and in the center.

"We have a cross shaft, motor and reduction unit for operating this cross shaft. On this cross shaft there is an eccentric which oscillates these rails up and down the machine, the rail on one side will be going up while the one on the other will be going down. This is about as simple an oscillator as we have ever seen and those which we have out are working very nicely indeed.

"We have also made improvements to our doctor. These are now being made so that excessive pressure cannot be applied to the blade, for we have found that it is not necessary to have very much pressure on a flexible blade. We make the doctors so that they are a little out of balance on the blade side, about one-half pound to the inch, and this is really all the pressure that is needed.

"We have also experimented for the past six months or more with doctor blades. Have tried making blades of all kinds of metal—tried various kinds of steel, stainless and other kinds, monel metal—but we have found that bronze seems to work out best. It tends to keep the roll clean, does not score the roll as will the steel blade—and from our experience we believe it will last longer and it costs no more for replacements.

"We have also been building quite a few specially treated suction box covers. We use maple which is treated in our shop and then we machine and drill it in the usual manner. The suction box covers which we have of this design are working out very well. They will keep their surface and not require planing that the ordinary cover does, and we believe that with this treatment we give the wood it is easier on the wire."

High Speed Dandy Roll at Dalhousie Mill

The mechanical operation of dandy rolls on high speed machines has, up to the present time, presented many diffculties, but from our experience with a trunnion-supported dandy on our

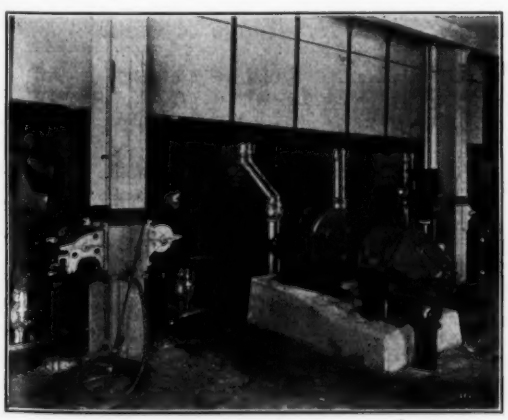

FIG. 9

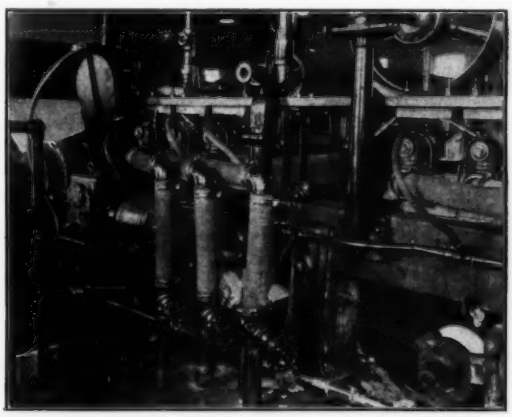

FIG. 11

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news print machine at the Dalhousie Mill of the International Paper Company (which has a speed of approximately 1100 feet per minute and a wire width of 227 inches) the installation has been a progressive step in the manufacture of better news print.

The dandy used was supplied by the Johnson Wire Works. It is 24 inches in diameter, has a length of 19 feet 3⅞ inches between shoulders, i.e., overlaps the wire about 2½ inches on each side when the wire is centralized. The race for the trunnions, extending beyond these shoulders, is ⅝ inch wide and has a diameter of 22 inches. The trunions are 5½ inches in diameter and ⅝ inch thick. The greater portion of the weight of the dandy falls on the trunnions nearest the slice which are 7 inches back of the center line of the dandy, the forward or dry end trunnions being 13 9/16 inches ahead of the center line.

This trunnion method of supporting the dandy roll in the opinion of this user is of major importance as it enables the roll to run true without any appreciable amount of vibration at high speeds, which condition at such speeds was hard to obtain and maintain with the old type dandy supported on a shaft with journals.

They have located the dandy between number 3 and 4 suction boxes as the moisture content of the sheet at this point seems most favorable for dandying. As seven suction boxes are used, since they did not wish to discard any in order to install the dandy, they were forced to move them quite close together so that now they are rather cramped, being only 10⅞ inches on centers. However, they are still able to remove or replace suction boxes without disturbing any adjacent equipment. They are running the dandy over two table rolls in order to prevent wear of the suction box covers that might be caused by the dandy roll depressing the wire slightly.

The operation of the dandy, including its removal for cleaning with steam about once a day when in use, is handled by the regular machine crews so the actual labor costs of the machine while producing a dandied sheet is about the same as when making the standard sheet.

The dandy roll was put into operation without an unusual number of breaks in the sheet and to date we have not had any breaks that we can directly attribute to its use. Wire life does not seem to have been adversely affected by the operation of the dandy either. In fact the average length of life of Fourdrinier wires on this machine has been slightly longer since the installation of the dandy roll, but of course as so many conditions affect wire life this additional time of service cannot be credited to the dandy.

The effect of the dandy on the sheet itself has been noticeable only in the formation, which it has improved by giving a closer sheet. They have not found that it gives any additional strength to the sheet as regular tests on the sheet both before the dandy roll was installed and since show the same range of strengths.

Dalhousie Mill Experience with Press Doctors

G. D. Bearce, manager of the Dalhousie mill of the International Paper Company, writes as follows:

"The chairman of the equipment committee of TAPPI in requesting us to prepare a report on the operation of Lodding Doctors on machine presses, placed us in a rather difficult position for, while we use the Lodding doctor and find it quite satisfactory, we are only using one Lodding out of a total of twelve press doctors, the balance being chiefly Vickery, a doctor of the same 'thin-blade' type as the Lodding.

"We find very little difference in the operation of Vickery or Lodding doctors on this service as they are of the same type but do find that they both have several advantages in common over the heavy brass blade with felt wipe that we are still using on four of our presses.

"The natural function of a doctor is to keep the roll clean and we find that these 'thin-blade' doctors do this much better than a heavy blade with or without the wipe. They also do away with the raising and cleaning of the doctor frequently necessary with the heavy type.

"Because of the fact that the Vickery and Lodding doctors are self-aligning and fit snugly to the face of the roll it is unnecessary to grind the blades true as they become worn, or to grind them if the crown of the press roll is changed. This grinding is necessary with the heavy blades. A further advantage of the thin blade is that it cannot wear down to a wide bevel as does the thick blade. Another advantage of the Vickery and Lodding doctors is the time saved in changing blades. We find that we are able to install one of these blades in several minutes while it takes a few hours to install a heavy blade.

"We are also experimenting with a stainless steel blade, 7 inches wide and ⅛ inch thick on one of our presses and have found this keeps the rolls quite clean, although not up to the standard of the Vickery or Lodding doctors. Due to its thickness, it will require grinding, unnecessary with the thin blades and of course has not the self-aligning feature of the Vickery or Lodding doctor. Its chief appeal lies in its cheapness. We have not been running long enough to be able to go into the economies of the different types of press doctors in use here as we have no figures on the life of different types of blades.

"To distinguish between the relative merits of the Vickery and Lodding doctors is a much more difficult proposition than to compare them both with the heavy type. The only difference that we are able to note is that we have found the Vickery doctor easier to adjust. The blade rate of wear seems to be about the same for both doctors and, although the blade of the Lodding is wider than that of the Vickery, this is offset by its slightly higher price. Our Lodding doctor has been in service over seven months and we have found that the following claims of its manufacturer are not excessive:

" 'It is self-aligning and fits snugly to the face of the roll.

" 'Requires very little pressure in comparison with other doctors, only about one-tenth of a pound per inch of width being required.

" 'No oscillating mechanism is necessary with the Lodding doctor.

" 'The blades are very economical, have long life, and only require two minutes to make a change.'

" 'The Lodding doctor positively will not score or mark the roll.'

"We have already discussed several of these at length, such as the self-aligning feature, and the short time for blade changes. We are using a slightly heavier pressure than they call for but in spite of this the Lodding Doctor lives up to its final claim in that we have not been able to find that it scores or marks the roll."

The Travelling Cut-Off

Samuel M. Langston has contributed the following information:

"The travelling cut-off we are building has been in process of development for the past year, and the first cut-off resulting from these experiments and rebuilding is in the finishing process at the present time.

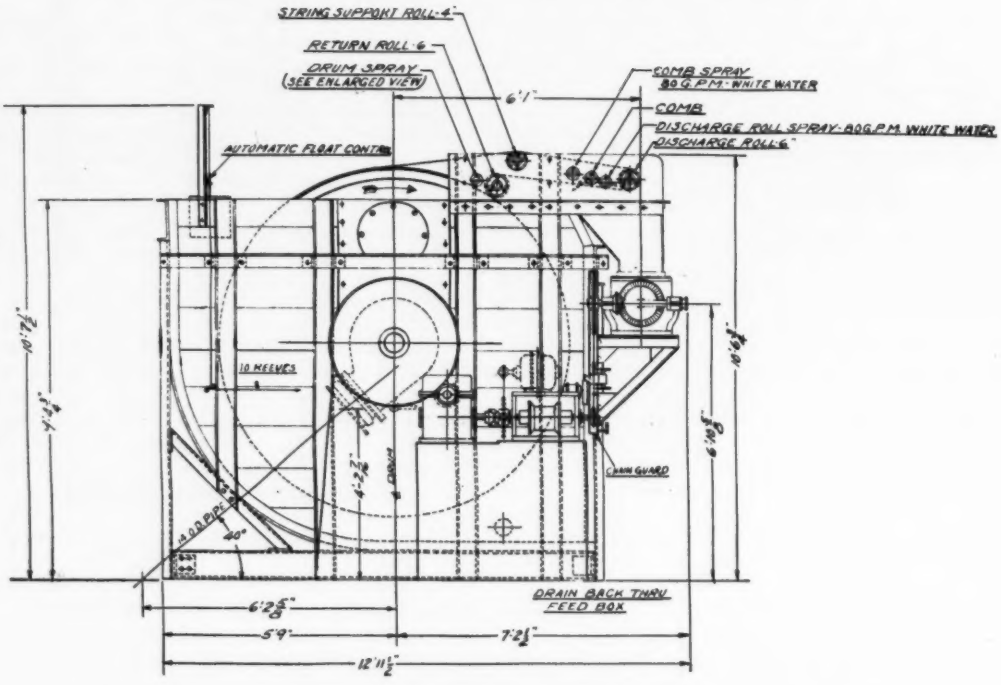
"The machine is a continuous operating knife, the cutting elements travelling with the material while cutting it, then speeding up out of the path of the advancing material, so that when the cutting elements separate, they clear the sheet and are ready for the return stroke; these elements, of course, travelling back and forth in a cycle of operation.

"By varying the number of strokes per minute, through the means of three to five setting in a gear box, we are able to get a sheet cut in steps of 1/32 from 36 to 72 inches, and in 1/16 from 72 to 144 inches.

"Now the speed of the knife at the cutting point must always be the same as the travel of material, and we accomplish this by means of two pairs of elliptical gears, adjustable, through a differential gear, with reference to each other, so that irrespective of the number of strokes per minute the cut-off makes (which you will remember is the means by which we vary the sheet lengths), we are able to keep the speed of the knife at the cutting point the same as the speed of the material it is cutting. That is, the time it takes to make a cycle does not affect the speed at the cutting point.

"For instance, in cutting the minimum length sheet, say 36 inches,

5500 GPM



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the elliptical gears are set so that one pair of elliptical gears neutralizes the effect of the other pair, and the result is the same as if a plain 1:1 ratio gears were being used. To cut 72-inch sheets the elliptical gears are set so that we get the effect of only one set of elliptical gears, and for 144-inch lengths they are fed to get the effect of a double set of elliptical gears.

"Thus by setting these gears so that the maximum speed in the cycle of the elliptical gears is used for cutting, we can slow down the return of the knife so four times as much material passes in one cycle as when the elliptical gears neutralize one another. In other words, the knife in cutting the 144-inch sheets will make one-quarter the number of cuts per minute as are used in cutting the 36-inch sheets. This number of strokes being secured through the change gear box and determining the length of the sheet, while the cutting speed at the cutting point is maintained by the setting of the two sets of elliptical gears.

"In building these knives, we can build them to cut a minimum of 18 inches and a maximum of 72 inches, or we can build them to cut a minimum of 36 inches and a maximum of 144 inches. In other words, the minimum length has to be determined, and this can be anything between 18 inches and 36 inches, but the maximum will have to be four times the minimum.

"The cut-off is built so that everything runs in oil, all the gears are chrome nickel heat treated or nitralloy gears, and all the bearings are roller or ball bearing, and everything is protected from dirt and grit."

The Downingtown Extractor

C. R. H. Johnson, of the Downingtown Manufacturing Company, reports:

"A new and novel device has been developed for removing large quantities of water safely from the sheet after it comes off of the last cylinder mold. Removing water at this point is the logical place because in doing so it prevents a lot of troubles that take place in the preliminary presses, through which the sheet is carrying a large amount of water.

"This device is known as the Downingtown Extractor. It consists of a wire faced bottom roll. This roll has a stiff cast iron core on which are mounted heavy cast bronze spiders. These spiders support brass rods, on which is wound a copper winding wire on a very close pitch. This roll is mounted in adjustable anti-friction bearings. The top roll is rubber covered on a cast iron core having steel journals and is also mounted on anti-friction bearings. The whole unit is designed for compound weighting. It is equipped with a slice, as a very large amount of water comes up through the pick up felt. A shower is placed on the bottom roll to keep it clean.

FIG. 13

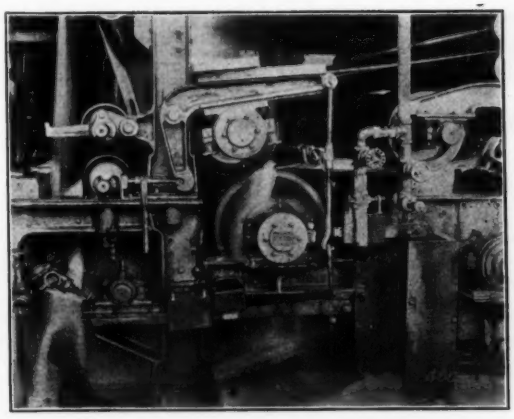


FIG. 12

"The extractor roll does not require a suction pump, and up to the present time, no single installation has been driven.

"Fig. 12 shows the Penn Fibre Board installation, an extractor on a cylinder machine running in a manner found in most mills.

"Fig. 13 shows an installation on a machine running in the opposite direction at the Manchester Board and Paper Company, where what is known as the top felt is really on the bottom. The sheet comes in contact with the wire surface of the bottom roll and part of the water goes down through this facing and the rest of it goes up through the pick up felt.

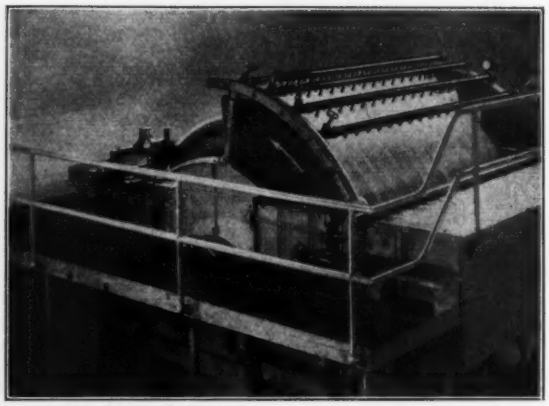
"The basic reason for the success of the extractor is the ability to directly weight the sheet very heavily and press out the white water safely. The wire face of the bottom extractor roll allows the water to pass through the roll when the very wet sheet is under a high nip pressure, without disturbing the original formation. It has been proven conclusively by tests that a solid bottom roll will cause trouble in this location. As a matter of interest, below is a table of nip pressures per inch of face at different points on cylinder machines, which will give a comparison to those carried by extractors. Incidentally, we have found only a few first main presses weighted over 200 pounds per inch of face.

Position	Nip pressure in pounds per inch face
Cylinder moulds	8 to 15 pounds
Wringer rolls	15 to 30 pounds
Primary presses	30 to 125 pounds
First main presses	75 to 200 pounds
Extractors	50 to 100 pounds

"It will be seen from this table that the weighting of an extractor comes within the range of primary press weighting. To use a heavy nip pressure as it comes off the last mold, makes it possible to send the sheet much drier to the presses. If the machine operator for some reason wishes to carry heavier weights on his presses, he may now do so without fear of checking. It is interesting to note that wherever an extractor has gone into action, the white water disappears from all of the wringer rolls and sometimes at the first primary press. Therefore, many wringer rolls have been removed from the machines on which this device has been installed. Suction boxes which are located on the pick up felt just before going into the wringer rolls, have also been removed.

"The Consolidated Paper Company, of Monroe, Michigan, under the guidance of Mr. A. H. Lockwood and Mr. W. H. Kimball, have made some interesting tests on one of their cylinder machines in regard to the effect of an extractor. The following is an interesting table showing how the wringer rolls on this machine do not remove any water from the sheet when the extractor is in operation. Incidentally, the wringer rolls have since been removed.

Save on Your Bleach Washing



Oliver United Bleach Washer in the mill of the Provincial Paper Co., Port Arthur, Ont.

—Fibre loss less than 0.2 lbs. per 1000 gals.

—Chlorides washed to less than 0.1% Calcium Chloride

—Low wash-water ratio, less than 17:1

These are typical of the results being obtained by mills using OLIVER UNITED BLEACH WASHERS. Such performance has definitely shown that these Washers

Save fibre

Save water

Save on upkeep costs

Prevent loss in discolored stock

Wash pulp more thoroughly and at less cost than any other method

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Position on the machine	Per cent stock content
After last cylinder	12.9 per cent
After extractor	15.5 per cent
Before wringer rolls	15.0 per cent
After wringer rolls	14.9 per cent
After last primary	20.6 per cent
After 1st main press	31.1 per cent

"In regard to the amount of water removed by an extractor, tests have been run at different times on this particular machine, with the following results:

WATER REMOVED BY EXTRACTOR

Test	Per cent stock before extractor	Per cent stock after extractor	Ratio water to stock before extractor	Ratio water to stock after extractor	Pounds water per pounds dry stock
1.	12.9	15.5	6.75:1	5.45:1	1.30
2.	10.63	12.04	8.41:1	7.31:1	1.10
3.	11.56	13.37	7.65:1	6.49:1	1.16
				Average.....	1.19

"In addition to this amount of water removed from the sheet is that which is pressed out of the pick up felt. Tests have been made in various mills where extractors are installed, by placing a trough underneath the entire unit. The shower is shut off and the white water measured. It has been found to range from two to three pounds per pound of dry finished paper. This is the total amount of water removed from both the sheet and pick up felt. In contrast to this, tests run on suction drum rolls have been found to remove only one-half pound of water per pound of dry finished board.

"To demonstrate how safely the white water is removed from the sheet by the extractor, the machine was struck out and samples removed at strategic positions. The machine was producing at the time, 28-point board. The sheets when taken off of the machine, were allowed to dry normally and were then calipered, and the amount of shrinkage noted. Below is given results of these tests:

Position	Per cent consistency	Dry caliper	Per cent contraction
After last cylinder	12.9	.0457	...
After extractor	15.5	.0429	6.1
Before wringer rolls	15.0	.0415	9.2
After wringer rolls	14.9	.0400	12.5
After last primary	20.6	.0383	16.2
After 1st main press	31.1	.0388	15.1
After last calender	95.0	.0281	38.5

"It will be noticed that the extractor increased the consistency of the sheet from 12.9 per cent to that of 15.5 per cent and compressed the thickness only 6.1 per cent. When it is considered that the sheet is in its wettest condition in going through the extractor, it is remarkable to note how little the per cent compression is when compared with the total compression of the sheet to that of 38.5 per cent when it is wound up on the reel. This explains then why the sheet does not crush or blow when the white water is being pressed out of same, because it is deformed so little.

"In starting the sheet off through the machine, the extractor removes considerable water and leaves the sheet in a uniform condition, which means that it can go through the rest of the presses more safely. It arrives at the calenders more uniform in thickness and with a surface that does not require as many nips as heretofore to obtain the desired finish. This means it is possible to retain more of the bulk that was originally in the sheet when it was formed. This effect of the extractor also helps the test of the board. It has been found in some mills that in making liner, savings can be effected in the furnish by using lower priced stocks and still obtain the required test. Again because the extractor can handle slower stocks without blowing, it has been found that savings can be effected here by eliminating higher priced fibers that are more free. It is obvious that the finish is better.

"It might be said here that because the top felt is kept cleaner, picking is eliminated, which in turn also has an effect on the finish of the board."

Dowingtown Board Forming Machine

E. T. Street of the Downingtown Manufacturing Company reports:

"The object of the design of the Downingtown board forming machine was to develop a machine which would produce a thick, homogeneous board of good formation from a wide range of materials and at the same time be simple in construction; easy and economical to operate. This involved freedom from sensitiveness to slight variations in the characteristics of the stock as received by the machine. The proper formation of long free stock such as is used in the manufacture of many insulating boards was one of the prime considerations.

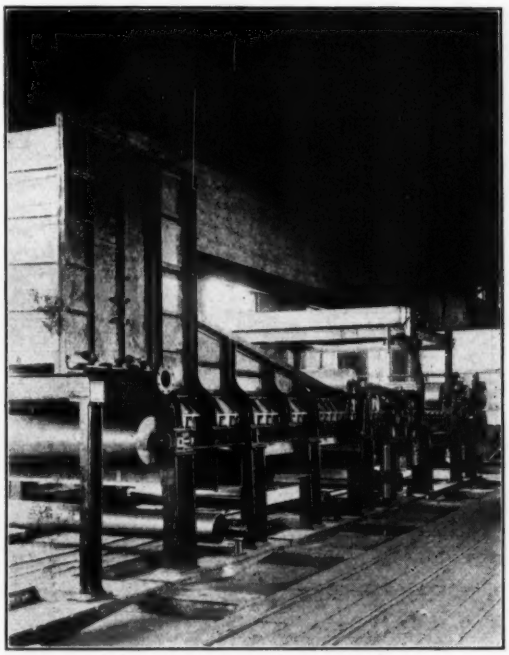


FIG. 14

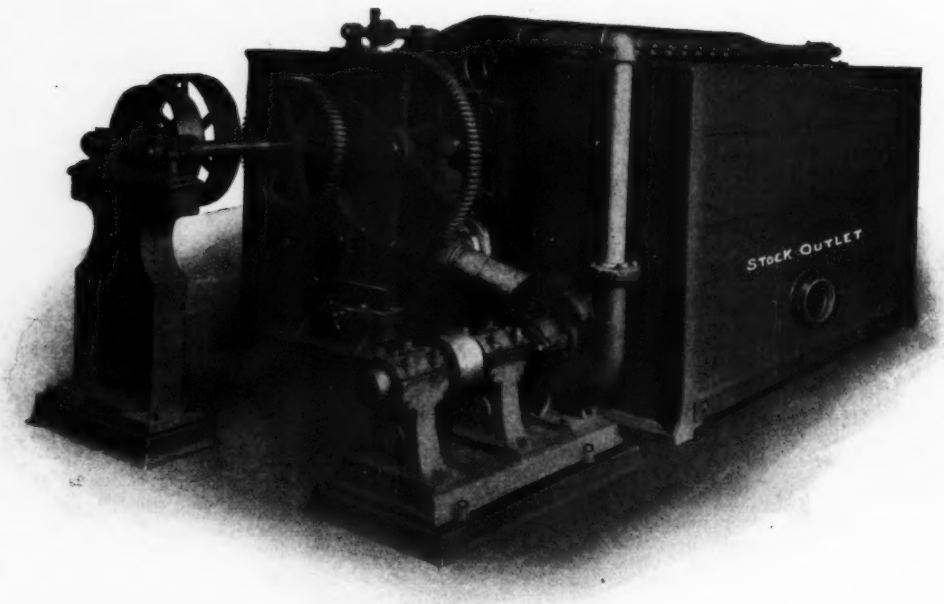
"The machine as developed is a pressure Fourdrinier in which the forming wire is the floor of the forming chamber where a pressure is set up by a head of stock and water. The head maintained is varied with the freeness of the stock, the thickness of the board and the speed of operation.

"Fig. 14 shows a machine built to produce a sheet eight feet wide up to three inches thick.

"The forming wire enters the forming chamber over the lower breast roll and under a carefully constructed apron which prevents any outflow of stock and travels from this point over closely spaced table rolls to the nip roll at the outlet of the chamber. The edges of the wire are supported on bronze strips carried on the ball bearing housings. After leaving the nip rolls, the forming wire carries the sheet on through the primary and main presses to the discharge end of the machine.

The roof of the forming chamber is sloped toward the outlet on a gradient which gives an approximately uniform velocity of stock flow in all sections. The roof terminates in an adjustable section which carries a top breast roll and a top nip roll which are maintained in a constant relation to the terminal section of the roof plates. A top wire is introduced into the forming chamber over this top breast roll and under an apron which prevents the outflow of stock. From the top breast roll, the wire travels under and in contact with the terminal roof plates, between the nip rolls and on through the presses to the discharge end of the machine. To neutralize the lift of the stock pressure on the adjustable roof plates and apply sufficient line pressure on the nip rolls to compress the sheet, a pair of hydraulic cylinders is provided. One cylinder is mounted on the frame at each end of the nip rolls and the two are piped up to a common supply. By changing the supply pressure, any desired pressure can be carried on the rolls regardless of the thickness of sheet produced. A similar unit is provided for applying pressure on the primary press rolls.

A Revolutionary Announcement to the Paper Industry



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Booklet upon request

THE MOORE & WHITE COMPANY

PAPER MILL MACHINERY

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"The inner surface of the forming chamber is constructed entirely of non-ferrous metals presenting a smooth surface to the stock at all points.

"Stock is passed through a baffle chamber in which one baffle is fitted with gates to control the lateral distribution of stock and introduced into the forming chamber over an adjustable dam which is set at the proper height for the head at which the machine is to be operated. As the horizontal wire travels through the forming chamber, a sheet is formed beginning just after the apron and formation is completed shortly before the nip rolls are reached. As the rate of formation decreases, the cross section of the forming chamber also decreases, thus securing satisfactory stock velocities. It is possible to control the direction of flow so as to secure any particular results desired. The action of gravity is always with the flow of stock, so it is particularly suitable for handling heavy stocks that are difficult to hold in suspension. As the newly formed sheet approaches the nip rolls, its upper surface comes in contact with the top wire and the sheet is gradually compressed between the conveying wires until it reaches the nip rolls where it is squeezed with sufficient pressure to prevent any escape of water from the forming chamber. The pressure required varies with the head carried and the stock being handled. When the thickness of the sheet is changed, the outlet automatically adjusts itself to accommodate the new thickness without any change in pressure.

"As the bare wire enters the forming chamber, the rate of formation is very rapid and a small amount of fine fiber passes through the wire before the longer fibers form their own filter. After the first thin sheet is formed, the water as it leaves the sheet is clear. To take advantage of this condition, the save all is divided and all the water from the first section of forming surface is returned to the head box and any water wasted or returned to the stock preparing operations is taken from the clear water section. As the freshly formed sheet passes through the primary presses some stock falls off the edge of the wire and mixes with the water pressed from the sheet. This is also carried to the head box with the white water from the first save all.

"A complete laboratory machine using a 28-inch wire has been built and operated on a large scale. This machine is equipped with four main presses, six primary presses and a forming chamber which can be varied from 6 feet to 30 feet in length. It has been operated at the rate of over 60,000 square feet of ½-inch board or approximately twenty-four tons of finished product per day. The laboratory is located at Springfield, Ohio, and is equipped with complete pulp cooking and preparing apparatus, a small drier and proper testing and control devices. The laboratory can start with raw material in any form and turn out completely finished board.

"This laboratory machine has produced boards ranging in thickness from .075 inch to 1¼ inches and has handled successfully mineral wool, wheat straw, bagasse, licorice root and a great variety of wood fibers. It has also formed board from asbestos and asbestos mixed with cement.

"The advantages obtained by use of this machine are:—

"Straight line formation. The sheet is formed on a straight horizontal wire and delivered to the wet saws without bending or disturbing the original formation.

"Force of gravity is always acting with the flow of stock. There is no tendency for the newly formed sheet to slip, slide or fall off, as its own weight always tends to hold it in place and not disturb the original formation. This also avoids the tendency to segregate or classify the fibers.

"Produces homogeneous board. The formation takes place in a comparatively quiet pond and in one direction only. Therefore, there is no tendency to lay all the fibers in one direction, but to form a board with similar strength in all directions and without any cleavage line on which the board would split.

"Handles with equal facility a great variety of stocks varying widely in length, weight and freeness.

"Produces thick or thin boards as required with little or no change in the machine.

"Does not require vacuum pumps or other auxiliaries of any kind.

"Simplicity. The machine is most simple in design, construction and operation.

"Flexibility of design. The machine can be constructed as shown in the accompanying illustrations or with any desired combination of wires and felts on the presses. It is also possible to construct the forming chamber to use more than one kind of stock at a time and to alter the surface appearance at will."

Consistency Control Mechanism

F. E. Bentley, of the Noble & Wood Company, describes this apparatus.

"Briefly stated, the action of the consistency control is dependent on a differential gear. The bottom gear of this differential is driven by a motor. The top gear drives a finder which revolves in a dead area of the mixing chamber. The two pinions of the differential are attached to a cam. This cam is free to move to the right or left twenty times a minute which is the number of revolutions of the driving gear. This cam also has two inclined planes on which two weight pins ending in roller bearings are carried. With weights at the top of the pins representing 4 per cent stock, and with stock in the dead area of the chamber the same consistency, the pinions simply revolve on their axes. Any change in

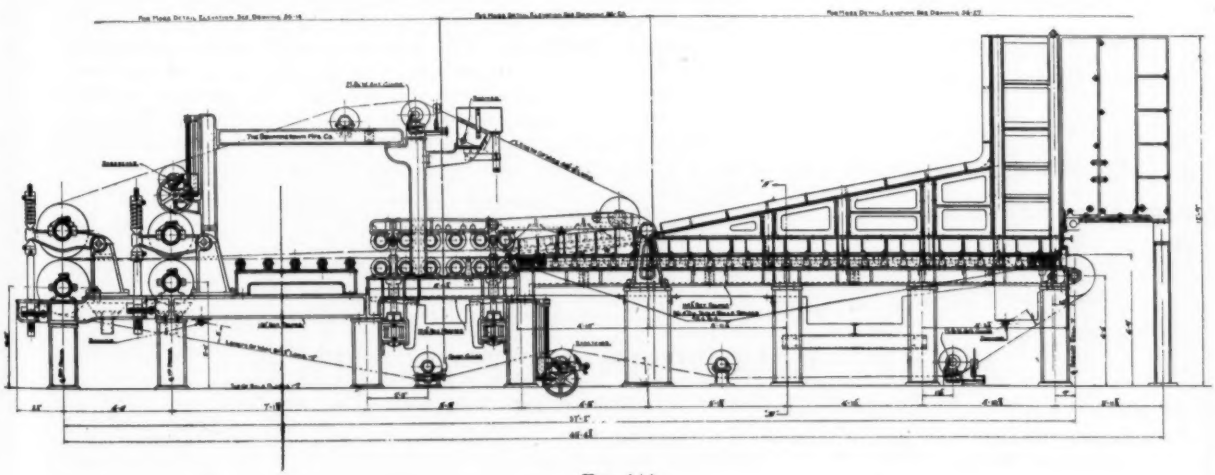

FIG. 14A

The New and The Difficult Processing Problems

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The genius of the chemist, plus the skill of the converter are steadily uncovering new uses, new products, new markets—for paper. Hundreds of the most profitable lines of popular products now look to the more progressive paper converters for their basic materials.

The progressive converters are those who recognize the necessity for maintaining equipment designed to cover the new requirements in processing. Older methods and older machines can frequently accomplish the desired results in fabricating and finishing for the modern materials and effects. But quality, quantity and the consequent profits from production are usually sacrificed. The cost of modernizing your equipment can be offset many times over by the value of the economies and advantages that are secured. Operations speeded up or the number cut down, time and labor saved, maintenance expense reduced. In some instances, less equipment now does the job.

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density of the stock causes the pinion to walk either to the right or left, carrying the cam. Notches or steps on this cam select which way a ratchet shall be operated, by a pawl, to open and to close a water valve of balanced design.

"All this heavy ratcheting is handled by strong steel members. The task of selection which involves small parts and light construction is independent. It simply passes this duty to the strong parts and thus at no time is the delicate balance, necessary to close control, disturbed. The mechanism is locked during the ratcheting period, and a complete cycle of selection and ratcheting occurs twenty times a minute.

"In connection with the control mechanism, and fully as important, is the white water valve. Much time and study have been given to the problem of adding sufficient water in the shortest possible time. The valve must be fully balanced. Balancing is accomplished by valve plugs. These bronze plugs are turned carefully to micrometer fits so that water flowing past one plug balances the other. Water enters at the top of the valve, passes through the two ports and out at the side. There are no gates to become clogged with fiber. There is no seepage past the valve as it is self flushing."

The Schuster Magnetic Gauge

A report was received from G. L. Hammond, of the Black Rock Manufacturing Company, Bridgeport, Conn., describing his gauge for measuring paper thickness:

"The action of the gauge is somewhat similar to that of the Wheatstone Bridge, using two varying magnetic currents to produce the needle or indicator movements. In order to produce these varying magnetic currents, the gaps between the magnets and their keepers must be varied. These variations are obtained through the varying thicknesses of the material being measured, and by certain amplifications of these currents very minute measurements may be indicated. These principles are basic, although they are applied in several forms of construction.

"A little over a year ago we received an order from the Government Printing Office in Washington, D. C., for one of these instruments to be used on tabulating machine paper. Apparently the paper manufacturers did not furnish paper having the close tolerances that the Government required, viz: that of plus or minus five-ten-thousandths of an inch. We installed the gauge on their slitting machine, which produced seven narrow rolls from one roll about twenty-six inches in width. Our gauge consisted of a steel roll and a magnetic carriage, and indicating and recording meter with relays that would stop the slitting machine in case the paper went off gauge plus or minus five ten-thousandths of an inch. This instrument has been in operation for about one year and has required no servicing from us, and we believe has given perfect satisfaction. In case the stock went off gauge, a part of the chart, showing the off gauge measurements, was torn off and a sample of paper taken and the roll removed from the slitter. It would seem to us that there would have been considerable saving to all concerned if the paper manufacturer had measured his paper in this manner before shipping. This installation in Washington has created a great deal of interest among the manufacturers of paper products and has been the stepping stone that enabled us to introduce the instruments to the paper manufacturer.

"This installation resulted in many interesting inquiries, and we were confronted with the necessity of actually applying our product to paper making machines. There seems to be a very decided difference of opinion as to where measurements should be taken, both as to the location on the paper making machine and as to what portion of the width of the sheet should be measured. Some believe that measurements should be taken as soon as the paper leaves the blankets or screens. Others maintain that it should be measured between the drier and the calender. Others that it should be measured between the calender and the windup. Some feel that measurements taken about eight inches from both edges of the sheet are sufficient. Others want measurements taken across the entire width, either through a series of magnetic carriages, or from one magnetic carriage that travels back and forth across the entire width. We can measure both edges by using our magnetic calipers, but so far we cannot get in much further than eight inches, from either or both edges. By placing a roll over which the paper must pass, we can use the magnetic carriage at any point over the entire width of the sheet, whether it be twenty feet or two feet. We believe it is possible to measure the paper in any of travel. We can do it continuously. We can indicate, indicate and record, or indicate record and give signals. It is also possible that mechanisms may be operated from the same impulses that give signals. For example, the flow box may be opened or closed, calendered rolls adjusted, different colored lights be lit, bells or gongs rung, or possibly a phonographic record, shouting, 'Too Thick,' 'Too Thin,' or 'Get on the Job.' I have measured a great many thousands of sheets of different kinds of paper and have found an average variation in thickness of about 10 per cent. While I was unable in many cases to know what standard thickness should have been, I am inclined to believe that the measurements run toward the heavy side. This is quite natural that they should, for the operator feels that he is not only less liable to get into trouble, but in most cases the mill owner does not seriously object to the product increasing in weight, but at the same time would, we believe, like, if he felt it were practical, to bring the thickness down to more nearly its required size.

"In closing I wish to state we believe we have an instrument that may be used on your products that will measure and record the thickness of paper while in motion without tear outs, and at the same time get signals indicating off gauge work and possibly make mechanical adjustments for controlling thickness."

Chlorination Equipment

R. B. Martin, of Wallace & Tiernan Co., Inc., reports:

"During the past year the paper industry, as a whole, has given more and more attention to the possibility of reducing production expense wherever possible. Among the most important considerations has been the study of various forms of slime problems, many more mills having turned to continuous controlled chlorination as a means toward eliminating loss of production time and other wastes associated with slime growth in the pulp and paper making systems.

"During the past year we have developed the combined chlorine-ammonia treatment, and by reason of the more economical treatment provided, we have not only reduced the chlorination cost for a number of regular users of chlorine, but we have also been able to assist a number of mills who had previously felt that chlorination alone would prove too expensive, in view of the possible savings to be derived.

"Due to the peculiarities in manner of combination of chlorine and ammonia to form the more economical chloramines, it is essential that both the chlorine and ammonia be accurately controlled, and applied in proper manner, and that the experience of competent investigators be relied upon to accomplish efficient use of the combined treatment.

"In explanation of the possibility of reducing cost of chlorination treatment we would advise that, in the average pulp or paper mill, the stock absorbs chlorine, to form organic chlorine compounds, before the work of destruction of the slime forming organisms is completed. Formation of chloramines maintains the chlorine in active form, retarding combination with the stock. This permits of application of reduced quantities of chlorine, with consderably improved sterilization results.

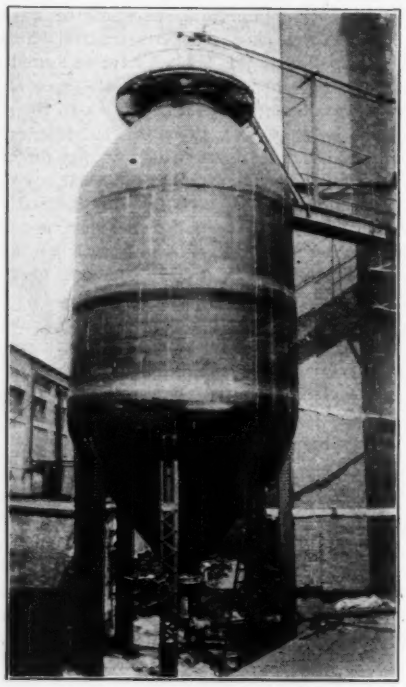
"We feel that this newer development in slime control practice will be even more favorably received by the paper industry during the coming year."

Pulpwood Power Rakes

As the use of power rakes for the storing and reclaiming of pulpwood becomes more general both in this country and Canada, new types of machines and towers have been designed to operate under almost any condition with a great saving in handling costs in wood handling.

CHEMIPULP PROCESS

Quality--Uniformity



Over **650,000** tons of sulphite pulp now produced annually in **18** sulphite mills located in the United States, Canada, and Newfoundland is ample evidence of the efficiency and economy of the CHEMIPULP PROCESS.

The enormous number of tons produced annually is of great importance, but it is the QUALITY and UNIFORMITY that are of foremost value. Every CHEMIPULP installation has shown a marked improvement in the QUALITY and UNIFORMITY of the pulp produced. This improvement in QUALITY and UNIFORMITY is reflected in the final product made from the pulp and in addition, assures lower cost of converting the pulp into paper. We have the direct testimony of paper makers to the effect that the improved QUALITY and UNIFORMITY has enabled them to run more steadily at a higher machine speed and to produce a better final product than they were ever able to accomplish when using pulp cooked by the cold acid process.

All grades of paper manufactured are now being made from pulp produced by the CHEMIPULP PROCESS and in addition a considerable tonnage of pulp produced for rayon is now being shipped daily.

Bleach consumption is reduced and at the same time, Mullen, Tear and Fold are increased.

It has been demonstrated that a much broader market is available to all plants producing pulp by the CHEMIPULP PROCESS.

Broadly protected by patents in the North American continent and in Europe.

We have an interesting and pertinent story on CHEMIPULP performance—substantiated by facts and figures that is well worth your consideration—write for it.

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319 Castle Bldg.
MONTREAL, QUEBEC

A recent modern power rake installation at the paper mill of the Maine Seaboard Paper Company at Bucksport, Maine, is a fine example of this point.

The power rake equipment for this installation consists of an improved traveling head tower, two traveling tail towers, a power rake, a special double drum motor driven haulage engine, and the necessary steel sheaves and cables.

Pronounced improvement is shown in the design of the head tower so as to centralize the loads and give better vision for the operator who is located in this new head tower in a special cab located near the top of the mast.

This improved head tower is mounted on four trucks, one at each corner, each truck having four flanged wheels designed to operate on two standard gauge tracks.

The two tail towers are so designed that they can operate on the same tracks that carry the stacker.

Most of the pulpwood used by this mill comes by boat and is unloaded into the water. The wood is then carried by an overhead

FIG. 16

cable type conveyor to the storage yard where it is fed to the stacker. As the wood drops from the stacker it is carried by the power rake to any desired part of the storage yard and formed into piles, or can be reclaimed by the power rake into a conveyor for delivery to the mill.

One operator can handle the entire equipment for the power

FIG. 15

rake and by the use of suitable lighting, operations can be carried on as well at night as in the day time.

Snow and ice have always been a great source of trouble when reclaiming pulpwood from storage, and the power rake has been a great help at the Maine Seaboard Paper Company's plant as the power rake is able to handle wood even when covered by snow and badly frozen as often happens in the eastern part of Maine.

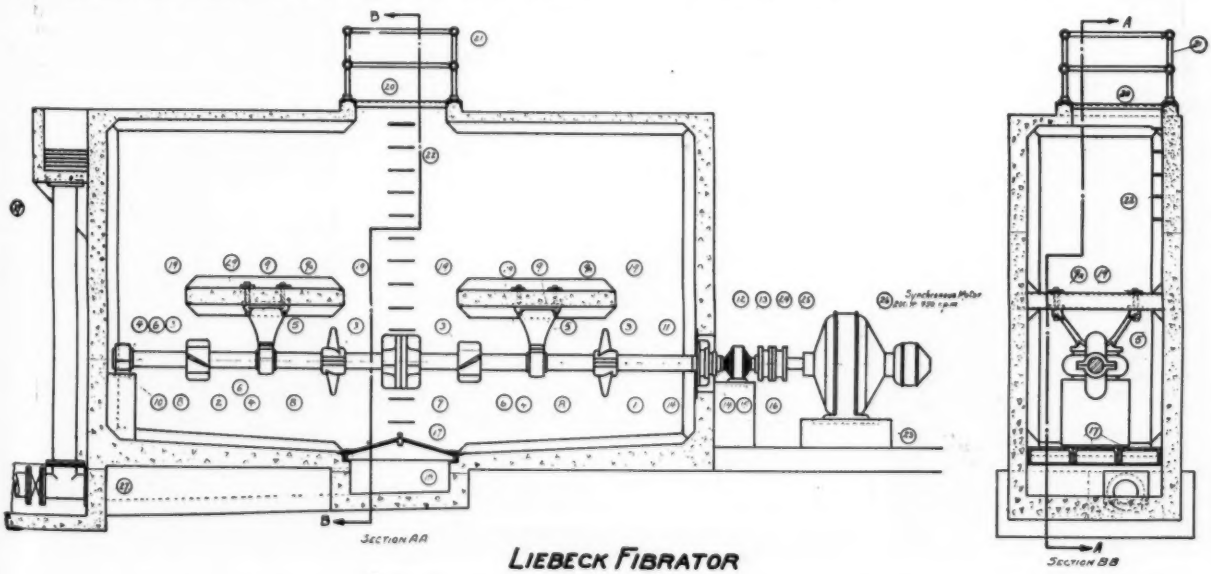
Fig. 15 shows the head tower and conveyor while reclaiming operations are under way, and Fig. 16 shows the power rake taking a full load of frozen wood.

The Liebeck Fibrator

Frederick Wierk of Johnson & Wierk has contributed the following:

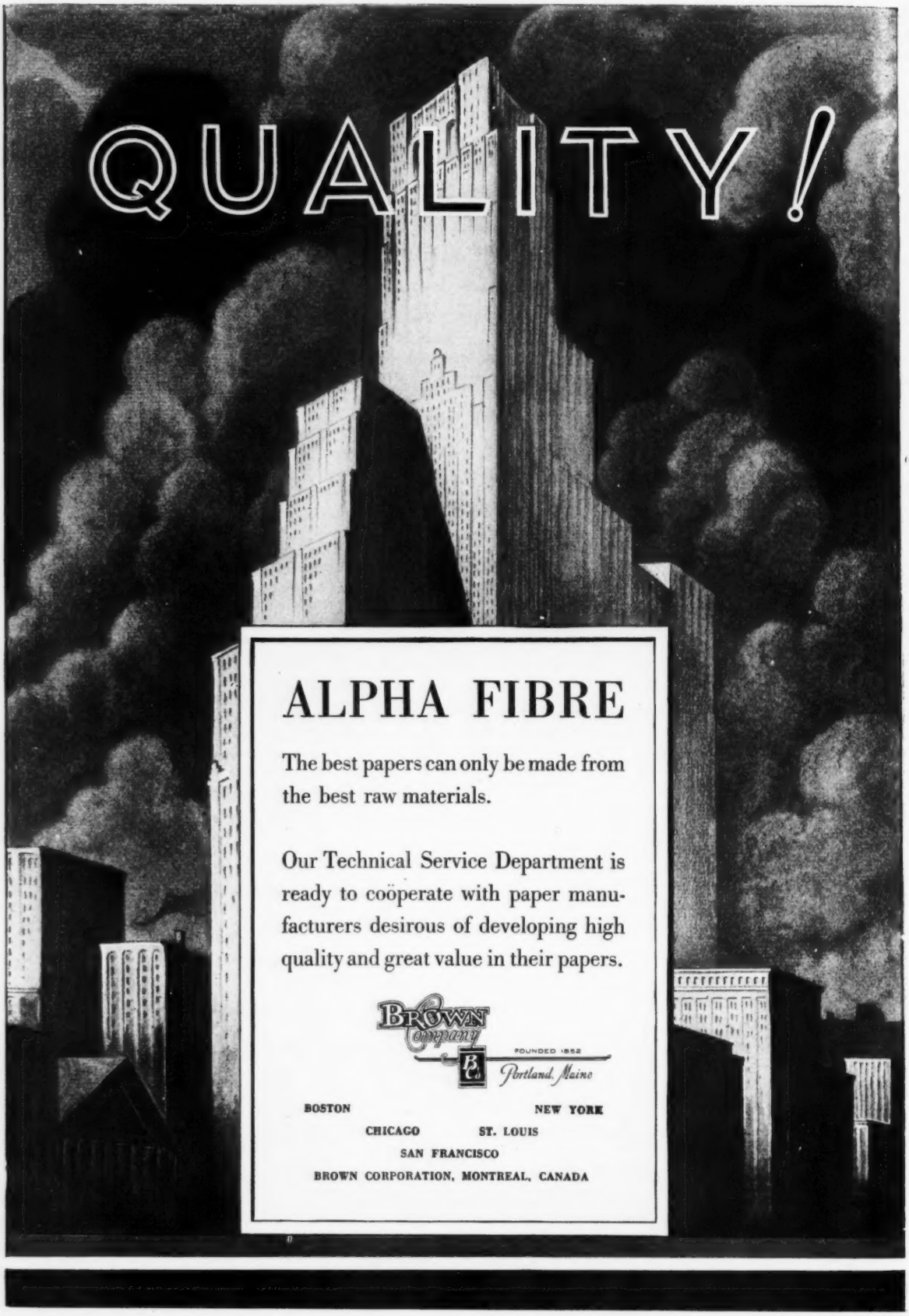
"A few years ago it was felt that the commonly used methods of stock preparation might be considerably improved upon and Harry Liebeck consulting engineer for Scott Paper Company, turned his attention to the problem. The object was to develop a machine which would, in comparison with existing system,—

a. occupy less ground space for a given capacity,
b. defiber the pulp more completely,
c. do its work faster,
d. use fewer horsepower-hours per ton of output,
e. require less manual labor,
f. be simpler to construct and operate,
g. be less expensive in respect to maintenance,
h. handle thoroughly frozen bales, and
i. be suitable, with slight change, for either batch or continuous operation.



LIEBECK FIBRATOR

FIG. 17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The best papers can only be made from the best raw materials.
Our Technical Service Department is ready to coöperate with paper manufacturers desirous of developing high quality and great value in their papers.
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BROWN CORPORATION, MONTREAL, CANADA

"About two years ago the results of Mr. Liebeck's studies were embodied in a machine which was placed in operation by the Scott Paper Company. Today there are four such units operating side by side.

"Figure 17, though undimensioned, will serve to describe the physical nature of the device. A concrete chest, or tub, about 26 feet long by 6 feet wide by 14 feet deep is built with horizontal webs about 6 feet above the floor. These webs are of such length as to leave the proper sized openings in the center and at the ends. In about the center of the space under the webs is a longitudinal shaft carrying two propellers under each web. The pairs of propellers at opposite ends are of opposite hand and the rotation of the shaft is such that the stock is driven toward the center where, with considerable turbulence, it rises and circulates rapidly towards the ends. Bales of pulp fed through the charging hole in the top by a slat conveyor. No separation of bales is necessary, only removal of wires and wrappers. Solidly frozen bales may be thus fed, and the water in this case need not be particularly hot, as it has been found feasible to use cool water, though it is reasonable to assume that heat might accelerate the disintegration of frozen bales.

"Figures concerning production, power, maintenance cost and other matters of economic consideration can be given only with the understanding that these items might vary somewhat with differences in stock to be treated, degree of defibering desired, and possibly, by the operating cycle employed.

"Where they are now being used three Fibrators are operated as batch machines. Five thousand pounds of pulp (air dry basis) are fed per batch, representing about 4½ per cent consistency. As the batch is completely defibered in less than twenty minutes, it is very easy to put through forty such batches per day, and this output may be easily increased by speeding up the filling and dumping of the Fibrator. On groundwood no trouble need be expected in getting, from a unit of the size given, an output of 120 tons per day. As sulphite is more defficult to defiber the output of sulphite stock is correspondingly less.

"In respect to ground space, a machine of this type with space for motor and pumps requires less than one quarter of the space taken by a breaker beater and its motor and pump.

"For a corresponding expenditure of energy and time, pulp may be more completely defibered in this machine than in other schemes.

"For the same reason, the same amount of energy will effect corresponding stock treatment in this machine in less time than is required by other defibrating methods, or, as a corollary, less energy will be required to produce the same amount of stock beaten to the same degree.

"Four units, such as are described above, require one operator and three laborers per shift, conveyors handling the pulp from either boats at the dock, or under-cover storage, directly to the machines, an operation formerly requiring 15 or more men per shift, representing an elimination of at least 288 man-hours per day.

"The construction, operation, and maintenance have proven, as might be expected from a study of the machine, less complicated and much less expensive than the same phases of breaker-beaters and other schemes for defibering pulp.

"Frozen bales, in breaker beaters and other machines with close clearances, had to be chopped apart and at least partially thawed. This labor, extra storage space, and the heat supplied, all served to increase cost tremendously. Into a Fibrator one may dump frozen bales after simply removing wires and wrappers.

"In respect to costs, it is safe to say that a unit as described, with motor, pump, and all fittings and "trim", may be built (above ground level) for less than $16,000 complete. With power consumption of approximately 24 kilowatt hours per ton and labor consumption of less than one man-hour per ton and Fibrator commands the attention of all who have pulp to defiber. Wherever frozen pulp has proven a nuisance this machine is in position fair to become a necessity.

"The author of this paper is greatly indebted to Messrs. Parsons and Liebeck, of Scott Paper Company for their permission to study the Fibrator in operation and for the records of its operation which they supplied."

Equipment Developments in 1931*

Part II—Pumps and Consistency Control

Agitating Methods and Consistency Control

By R. V. Bingham[1]

Agitation is rapidly becoming an outstanding factor in the manufacture of pulp and paper. Heretofore it has been generally assumed that pulp storage chests required little or no agitation. A storage chest in which agitation has been seriously attempted has usually been equipped with a number of paddle type agitators operating at a speed of 10 to 12 r.p.m. The number of units, however, is always held to a minimum in order to reduce the horsepower requirement. Irrespective of size, type or number of so-called paddle agitators, it is hard to conceive of any agitation taking place due to the efforts of the paddles, except in the plane in which they revolve.

In chests large enough to hold two or more digester cooks, little attempt other than paddle agitation has been made to blend the pulp in order to produce a uniform product before processing. Due to the lack of agitating methods, therefore, each cook has passed on through the mill, requiring, during the various cycles of manufacture, individual treatment, depending upon its particular characteristic.

In chests having little or no agitation also, there are many dead areas in which lumps of pulp form. These lumps not only have the disadvantage of taking up storage space, which greatly reduces the capacity of the chest, but also become sour and contaminate the new pulp entering the chest.

Agitating System

The apparent need for an improved method of agitating enthused our engineers to develop what is now known as the Bingham agitating system. In the development of this system, it was recognized that an agitating system and its equipment, in order to be practical and economical, must include all of the following twelve requisites:

The agitating system must uniformly blend the pulp.

The system must eliminate islands or dead spaces in the chest.

The units used with the system should be able to deliver pulp or liquid to an outside container or pump and continue the agitating system at the same time irrespective of the level of the pulp or liquid in the chest.

The units used with the system should be able to wash down the side walls and floor of the chest after the stock has been removed.

The horsepower required to operate each unit or group of units must be at a minimum.

Each agitating unit must be so designed as to eliminate the need of lubricants.

Each agitating unit must be made of material that will not corrode in the presence of water or acid, permitting scale or dirt to enter the pulp.

The system should be able to mix uniformly either chemicals

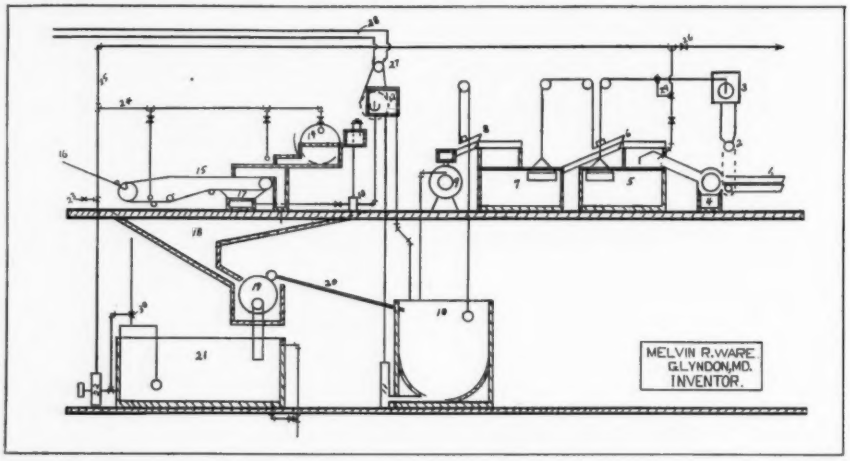
* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.
Contribution of the TAPPI equipment committee.

[1] President, Bingham Pump Co., Portland, Oregon.

Announcing Automatic Paper Making

Automatic operation is not only practical, but essentially desirable to the future progress of the paper industry.

The automatic process is without a doubt the greatest recent development in the paper industry, and the low cost of installation in comparison with the savings to be expected, and the simplicity of design and operation removes any cause for doubt, for the simple reason that it costs no more than is often spent for an ordinary white water system. Then consider that in addition to the simplest white water system, there are beater control and numerous other advantages some of which are of considerably more value than the white water system alone.



The accompanying drawing illustrates briefly the simplicity with which automatic operation is effected, which is merely a matter of proper control of the various units, and coordination of the units through master controls. There are however, means other than those shown for controlling the operation. A brief description is given of the operation as shown.

Raw stock is placed upon the apron (1) which is driven through variable speed motor (2) controlled through rheostat (3) to cutter (4) and beater (5) where white water is added. The solution passes through gate (6) to beater (7) and gate (8) jordan (9) chest (10) pump (11) and stuff box (12) where it is measured to pump (13) screen (14) and Fourdrinier (15). Sheet (16) passes on to presses and dryers. White water is collected at sump (17) for screen dilution. Overflow, spills and breaks are collected at pit (18) and passed through save-all (19). Reclaimed stock passes over board (20) to chest (10) while the white water passes through sump (21) and pump (22) to hose connection (23) showers (24) and beater line (25) with provision for line to pulp mill through pipe (26). The formed sheet (not shown) actuates variable speed motor (27) through wires (28) from an automatic michrometer, continuous scale, or suitable device (not shown) holding the sheet within tolerance through proportioning device (12). Float in chest (10) regulates flow from last beater (7) through gate (8). Float in beater (7) regulates gate (6) on beater (5). Float in beater (5) or, first beater in line will actuate rheostat (3) controlling variable speed motor (2) regulating feed apron (1) and white water valve (29), and float valve (30) at sump (21) admits fresh water to suction end of pump (22) compensating for evaporation at dryers, which completes the cycle of operation.
Note—While only two beaters, one jordan and one chest are shown, as many may be used as desired or, necessary, and floats or suitable device may be used for actuating the feeding devices.

NOTE—*No special type of beaters or paper machine is required for the operation of this system,* as we make a special design for each installation, assuring the best possible results.

We are especially qualified from the point of, both Technical and Practical training to handle these systems from either, the design of new mill installations, or, the application of the systems to present mill units, to the successful operation of the systems.
We are also interested in the installation of "DIRECT" white water closed systems, and "BEATER CONTROL" systems, and believe that no white water system is, *or can be* at its best efficiency without an efficient beater control system. And being the originator of both these systems through the invention of automatic paper-making, we also believe we are best qualified to install them.
We also believe that after serious consideration is given this matter it will be agreed that this system should form a part of contemplated improvements, and since the cost is so meager in comparison with the possibilities, there should be no hesitancy in investigating the matter. Why not? There is no obligation.

WRITE

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or colors, etc., that may be added to the pulp during any storage period.

The type of agitating equipment used with the system must be such as not to injure or hydrate the pulp fiber.

The agitating unit should be relatively light, requiring little or no superstructure for installation requirements.

The agitating unit should be so designed as to require a minimum of maintenance.

The cost of the equipment installed, required by the system should be no more, and possibly less expensive, than the equipment used in the present inadequate methods.

The Bingham agitating system is divided into two classifications. One system consists of a series of vertical agitating units designed to deliver pulp from the bottom to the top of storage chests and discharge through transfer pipes to zones supplying one or more adjacent agitating units. This bottom to top movement of pulp effects a complete blending of the pulp mass throughout the entire chest.

The other system consists of one or more vertical units delivering pulp from the bottom to the top of storage chests and distributing it either over the entire chest or into zones supplying one or more adjacent agitating units. The feature of this system, is the distribution, which is accomplished by means of a specially designed flinger located in a distributor housing near the top of the agitator column. The flinger establishes a uniform distribution, which not only uniformly blends the pulp mass in the chest, but also eliminates the possibility of dead spots or islands.

The first of the above systems, although applicable to any size or shape of storage chest, can be most effectively used in long horizontal blending chests or in round vertical chests. In a horizontal blending chest, the agitating units are installed at equal intervals throughout the length of the chest. Each unit is usually supplied with a Y-shaped transfer pipe directed to form a counter-current flow in the chest. The last agitating unit located near the discharge end of the chest delivers its capacity through a discharge pipe extending the entire length of the chest and discharging into the new pulp entering the chest from the intake end. The combination of counter-current flow and the long transfer pipe causes an acceleration of the pulp travel that greatly increases the number of agitating cycles from the time the pulp enters the chest until it leaves the opposite end. The number and size of units used depends entirely on the diameter and length of the chest.

In a round vertical chest, the units are installed near the side wall at equal distances from each other. The pulp is delivered by each agitator from the bottom of the chest to the top and then discharged through transfer pipes extending the full distance across the chest to a point equidistant between two adjacent agitating units. In this manner, the discharge of each agitator is made in zones supplying two other agitators, which again permits all the pulp entering the chest to be perfectly blended.

The second system is most applicable to round vertical storage chests. Irrespective of the number of units used, which is entirely dependent on the size of the chest, one agitator is generally located in the center of the tank with the bottom of the unit extending into a small drain type sump. The use of the sump permits the agitator to be effective when the pulp level in the chest is low.

The column of either type agitator may be arranged with a flanged opening to which a discharge pipe may be connected and extend through the wall of the chest. The discharge from this pipe may be used to fill other chests or to form a positive suction head on a stock pump. The combination of agitator and pump often eliminates serious pumping problems encountered when the pumping of stock is attempted from a chest having a bottom lower than the suction of the pump.

The flinger type agitator has the advantage of being effectively used to wash down the side walls and bottom of the chest by simply adding water into the chest, which in turn may be easily removed after the washing operation by the agitator-pump combination mentioned above.

The horsepower requirement of either type of agitating unit is comparatively small. It is interesting to note that as the stock level increases in the chest, the horsepower requirement of the agitating units decreases, which, of course, is directly opposite from the horsepower characteristic of the so-called paddle agitators. This, however, is in favor of the new system as the stock chests are normally kept from one-half to three-quarters full.

One of the dangers of mechanical agitation is the possibility of oil or grease, used for lubricating bearings, etc., entering the pulp. The use of lubricants has been entirely eliminated in Bingham agitators due to the use of a patented bearing requiring no lubrication during the life of the equipment. The lack of lubrication requirements also minimizes maintenance and, of course, eliminates the attention of the oiler, etc., all of which assists in keeping the pulp clean.

Keeping pulp clean, particularly after it leaves the screen, offers a problem concerning the materials used in the construction of the agitators. For sulphite mills, the column structures and agitator bowls are made of steel, which are leadized inside and out by a special electrical process in which the lead is forced into the pores of the metal. The lead surface is then covered with a special paint made to withstand the abrasion of the pulp. For sulphate mills, the column structures and agitator bowls are also made of steel. All parts are treated under a high temperature with a metal paint which, when dry, forms a hard smooth surface. To this surface a number of coats of special paint are applied, which satisfactorily resists the abrasion of the kraft pulp.

The use of the Bingham agitating system for uniformly mixing either color or chemicals in the pulp while in the storage chest is best illustrated by the results of a typical installation.

Uniformity of Circulation

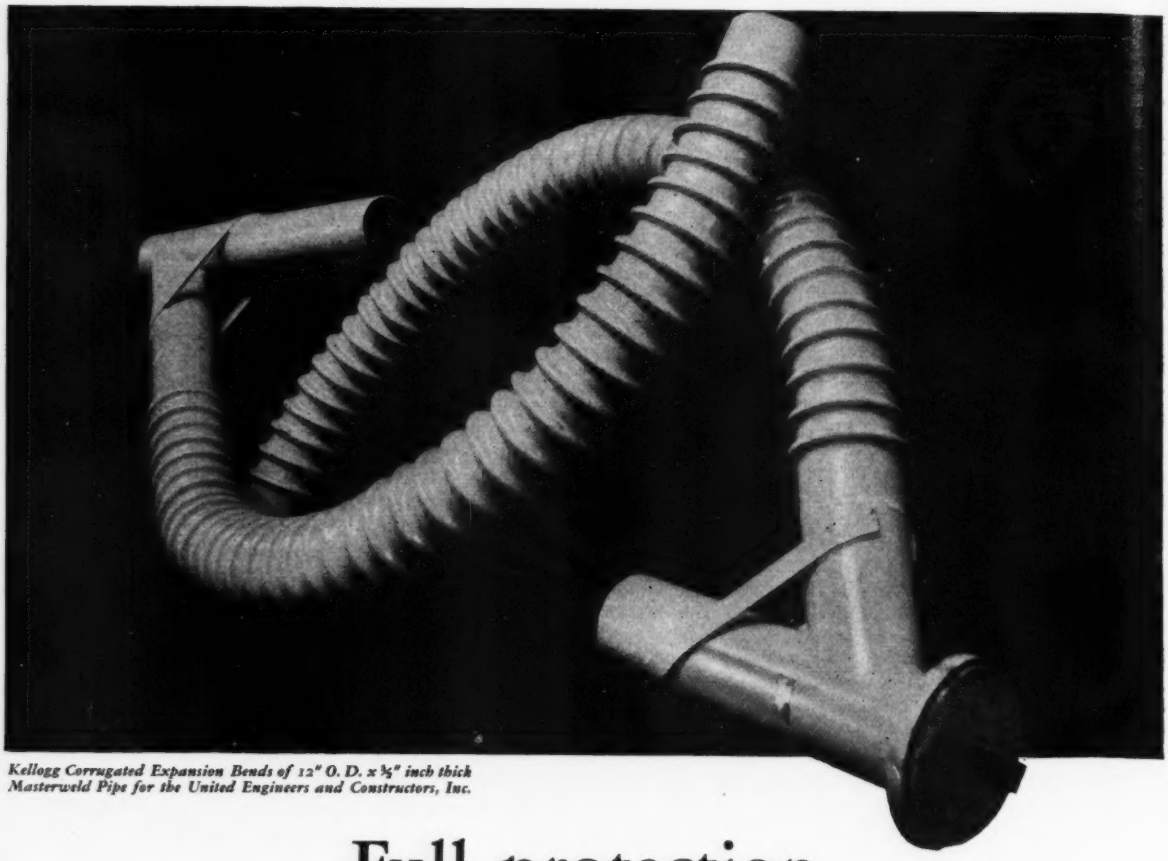
A small stock chest having a capacity of approximately 20,000 gallons of 4 per cent sulphite stock was supplied with one flinger type agitating unit located in the center of a 20-foot diameter chest. The unit, which had a capacity of 1,500 gallons per minute, was first allowed to operate for a few minutes to permit the pulp to become thoroughly mixed, thereby establishing a uniform consistency throughout the chest. Blue coloring was then added to the pulp at a point approximately one-third the distance between the side wall of the chest and the agitator. The agitator was then allowed to operate for 60 minutes, after which time the pulp in the chest apparently was the same color throughout.

To further check this test, however, the bottom of the chest was tapped, and all the free water was allowed to run off. By getting rid of the water, it was possible to remove the pulp in layers by means of hand shovels, and study each layer for dead spots. All of the pulp in the chest was found to be of the same color, with the exception of a small fillet of pulp located in the corner formed by the side wall of the chest joining the bottom. This fillet measured one inch in depth. The pulp in the fillet was white, and hence apparently had not been subjected to the coloring matter. This was later remedied by placing a fillet in the bottom of the chest.

Effect on Freeness

Probably the greatest danger in the mechanical agitation of pulp is the problem of hydrating and bruising the pulp fiber.

In one of the Pacific Coast mills, a long horizontal wooden chest 20 feet in diameter by 120 feet long, equipped with 5 Bingham agitating units, is being used for blending pulp. The capacity of this blending chest, when three-quarters full, is 227,000 gallons, which, divided by the combined capacity of five 2500 g.p.m. agitating units, requires one complete agitating cycle to be completed in 18 minutes. If the agitating units used in the



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Bingham system hydrate or bruise the pulp fiber, ample evidence should be found after hours of continued agitation on the basis of the 18-minute cycle.

During a shut-down period of the mill, the agitating units were allowed to run continuously and samples of the pulp, were taken hourly. The samples were taken from several points in the chest in order that average results might be obtained. The results of this test are shown in the following table:

Sample number	Per cent of consistency	Corresponding agitator time in 20 x 120-ft. tank, hrs.	Test No. 1 for freeness	Test No. 2 for freeness	Average of tests 1 and 2
1	4	0	705	700	702.5
2	4	4.5	700	700	700
3	4	9	695	695	695
4	4	18	690	695	692.5
5	4	36	680	680	680
6	4	72	665	670	667.5
7	4	144	650	650	650
8	4	288	615	610	612.5

The results of the test, as indicated by the above readings, proves conclusively that, based on a freeness test, the Bingham agitating system does not hydrate the pulp during any normal agitating period. After 9 hours, 18 hours, 36 hours, or even longer periods of agitation, it will be noted that the freeness of the pulp was not greatly affected. However, with this method of agitation, it should not be necessary to agitate except when the mill is in operation, and hence only the normal period of approximately 4 hours should be considered as the agitating time of this particular size chest.

After the above freeness tests had been completed, there were several samples of the agitated pulp left, from which was chosen a sample that had been agitated 76 hours. A slide was made showing the fibers of this sample, which were carefully examined under a high-powered microscope. After this long period of agitation the fibers showed no indication of being cut or bruised. If the pulp were being agitated by pumping equipment in which the head is created entirely by velocity, in accordance with the basic formula, $H = \frac{V^2}{2G}$ the fibers probably would be bruised or cut.

Consistency Regulation

Scientific consistency regulation is another important factor in effecting uniform processing throughout the various cycles of manufacture. Bingham recording consistency regulators are being used in many Pacific Coast mills to obtain this result. The regulators are made in three types. One type is adapted for chest regulation, another, for pipe line regulation, and the third, for machine head box regulation. By the use of these regulators, any predetermined consistency is maintained throughout a mill by automatically controlling the dilution water. The control is accomplished by means of a feeler, which revolves in a sampling chamber through which samples of pulp are continually being passed by a sampler pump. The feeler is so designed as to be very sensitive to any increase or decrease in the density of the stock passing through it. The sensitiveness of the feeler is reflected electrically by the power required to operate its driving motor. Any change in the power demand of the feeler motor is immediately transmitted to a control panel, which in turn controls an electrically-operated water valve governing the flow of dilution water. If the density of the stock increases beyond the predetermined percentage for which the regulator has been set, the power demand on the feeler motor increases and the electrically-operated dilution water valve automatically opens. If the density decreases, the valve closes. The operation of the regulator is at all times recorded on a 24-hour density control chart, which enables the operator to maintain uniform processing of the pulp in each department.

The following table represents hourly readings taken from a recording chart of a pipe line regulator controlling stock for the machine head box of a Pacific Coast mill. It was the desire of the operator of this mill to have the density of the stock entering the head box 3½ per cent. It is interesting to note how close the predetermined consistency was maintained throughout the entire 24-hour period.

	Per cent		Per cent
8 A.M.	3.52	5 P.M.	3.50
9 A.M.	3.52	6 P.M.	3.52
10 A.M.	3.48	7 P.M.	3.52
11 A.M.	3.49	8 P.M.	3.51
12 A.M.	3.48	9 P.M.	3.49
1 P.M.	3.50	10 P.M.	3.51
2 P.M.	3.53	11 P.M.	3.52
3 P.M.	3.51	12 P.M.	3.52
4 P.M.	3.51		

Although the success of the regulator depends largely upon the operation of the feeler mechanism, it should also be noted that the coordinating operation of the electrically-operated water valve is equally essential. The valve is specially designed to operate at thirty second intervals, and then for a period of three seconds only. The valve slide is arranged with a V-type opening, which allows the volume of dilution water to gradually increase or decrease instead of the valve being either wide open or closed. With this design of valve operating under the above schedule, the regulator is allowed to gradually increase or decrease the amount of dilution water instead of emitting slugs of water causing excessive dilution or vice versa.

The use of the sampling chamber, which is continually supplied with pulp from the main line by means of a sampler pump, eliminates the possibility of error usually encountered with pipe line type regulators due to both the velocity of the pulp travelling through the pipe and air that is usually present in the pulp. The sampling chamber is arranged with standard pipe flanges which may be adapted for any size pipe line. Installations of pipe line regulators should be made on the discharge side of stock pumps, and the dilution water line should be connected to either the suction of the stock pump, or it may be effectively used as showers washing pulp into the suction of the stock pump. The showers used in the above manner for dilution water are generally applied to deckers and rotary washers.

The most difficult problem encountered in maintaining a predetermined consistency is controlling the consistency of the stock before it passes onto the wire at the wet end of the machine. At this point operators require a density of from .25 to 1.25 per cent. The control of consistencies in this lower bracket has been successfully accomplished by a head box type regulator. The result of many density tests made on pulp controlled by this head box type regulator showed conclusively that this regulator controls the lower densities with the same degree of accuracy as the pipe line type or chest type regulators control higher densities.

The Bingham agitating system and consistency regulation have been effectively used in many Pacific Coast mills. From these mills we have selected three mills representing three different branches of the pulp industry, and each effectivly using the Bingham agitating system and Bingham recording consistency regulator.

Sulphate pulp—Longview Fibre Company, Longview, Washington.

Sulphite pulp—Weyerhaeuser Timber Company, Longview, Wash.

Sulphite pulp—Rainier Pulp and Paper Company, Shelton, Wash.

Latest Development in Vacuum Pumps

By Carlo Vicario[2]

On the paper machine, suction boxes and suction rolls served by vacuum pumps have two functions, first in influencing the formation of the sheet; second, in extracting water mechanically from the sheet before it reaches the steam driers. Theory and experience indicate that it is important to the economy of operation of the paper machine to remove the greater proportion of the water from the sheet mechanically rather than by evaporation on the driers.

[2] Assoc. member TAPPI, manager of the pulp and paper division of the Nash Engineering Co., New York, N. Y.

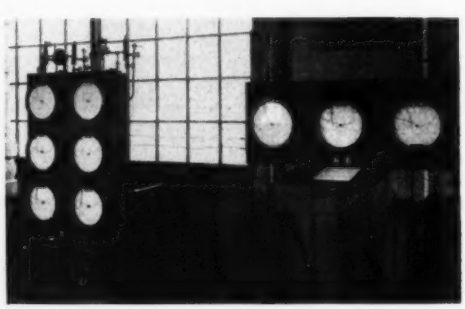
The Realization Of An Ideal!

General View of Operating Floor, Digester House—Weyerhaeuser Timber Co. Pulp Mill—Longview Washington.

● At Longview—Weyerhauser's ideal was a plant that would convert raw Western Hemlock logs into highest quality bleached sulphite pulp—*in the most efficient and economical manner.*

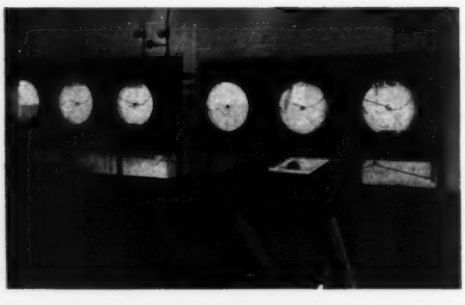
● At Longview—Foxboro Engineers designed the complete Instrumentation that made possible the realization of this ideal.

● At Longview—From the acid room to the machine room, instruments control those operations upon which the quality of the pulp depends. This means satisfactory production of super-quality pulp.



Foxboro Instrument Control Board for One Digester.

● As at Longview—so too in your plant we can help you. Foxboro has the Engineers, the Experience and the Instruments necessary to solve every problem in control of Temperature, Pressure, Flow or Level in the pulp and paper mill. Together with your own engineers they will be glad to make an Instrument Survey of your present or proposed plants.



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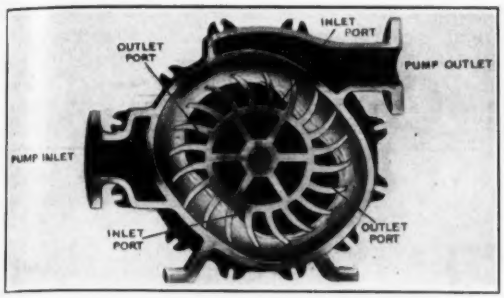

FIG. 1

Some figures which show the probable water content of the paper at various points on a typical one hundred ton high speed news machine will illustrate the quantities of water that are mechanically removed. Figures have been presented expressed in the percentage consistency of the stock at various points on the machine; these figures have been translated into actual gallons of water removed from the sheet in order to more clearly bring out the work done by the vacuum pumps. For this machine, starting at the wet end, water is being carried along the wire at the rate of about 800 gallons per minute as it reaches the first suction box. The vacuum pump, drawing on the flat boxes at this point, extracts approximately 650 gallons per minute and requires some 30 horsepower to operate. At the suction couch roll approximately 60 gallons per minute of water is removed, the vacuum pump requiring 100 horsepower. The first and second suction press rolls remove possibly another 25 gallons per minute, the pumps taking 50 horsepower each. The vacuum pumps therefore remove a total of aproximately 735 gallons per minute or 90 per cent of the original water content. Vacuum pumps for these services require a total of approximately 230 horsepower.

Figures for book, kraft and other sheets are difficult to give concisely because of the wide variation in weight and character. It is true of these in general, however, as it is of news, that the major part of the water is mechanically removed. The economical limit of mechanical extraction is reached when the cost of power for the vacuum pump equipment becomes equal to the cost of steam in the driers to effect the same removal. By running higher vacua on the couch and press rolls still more water could be mechanically extracted but the corresponding increase in the cost of power would balance the expected steam saving unless some notable improvement in vacuum pump efficiency were achieved. The Nash Engineering Company for some years has been experimenting along these lines to produce a new type of pump capable of higher vacuum with greater efficiency. From these experiments a new type of pump has been developed which gives these results. From a technical point of view the improvement is notable.

The Nash pump utilizes the kinetic energy of water in motion for its pumping action. Fig. 1 illustrates diagrammatically the ingenious method which was contrived to cause the water to alternately leave and enter the blades of a rotor thus drawing in and expelling the air. As a machine for continuous heavy duty service it is ideal. It is simple and positive in action and has only one moving part. The details of the operation of this pump are well known to you and I will pass on to the mechanical and hydraulic features.

In order to bring out clearly the advantages of the modifications in design recently perfected it will be necessary to describe in some detail the basic theory and the limitations of the present pump. The water, which acts as the pumping as well as the sealing and cooling agent, is made to revolve by the action of the rotor blades against it. At operating speeds it is thrown out by centrifugal force and follows the elliptical casing. It can be seen that whether or not there is any resistance at the inlet or outlet, or in other words, whether any useful work is being done, a certain amount of power is required to spin the water. This power is reduced to a minimum by fairing the curves of casing and rotor blades. The design is such that a film of water is constantly maintained over the port surface area between it and the rotor.

Suppose that the pump is running and we slowly throttle the suction line. The volume of free air necessary to replace the water being thrown out of the blades cannot get in. Therefore the air which passes is expanded and a partial vacuum is produced. At first the rotor blades are completely filled and emptied in each half revolution. As the suction line is throttled further to give say 14 or 15 inches vacuum surging and splashing of the water pistons begins to occur and the blades are not swept clear. Throttling still further to say 22 inches practically destroys the useful pumping action and capacity is zero.

In developing a pump for higher vacua sufficient data was at hand to establish correctly casing and blade shapes and diameters for a given set of conditions. Attention was immediately given therefore to removing the objections above described. The rotor was built on a central web with hollow ends and the ports were located on the surfaces of cones arranged to lie inside the rotor. The rotor ports are now at the bases of the blades and have about twice the area possible with the old arrangement. The stationary ports are correspondingly larger. The directions of air and water flow in the blades are now parallel. From a mechanical standpoint the new pump is very rugged and more accessible than the old design. Both heads are removable and the cones themselves are separate from the heads.

Needless to say, a great amount of time and effort were expended in arriving at what seems the most efficient design for the new pump. Experiments were made with various diameters of cones and with various lengths and pitches. The improvement in performance is more than gratifying. The capacity curve now is nearly flat out beyond 20 inches and the pump shows a shut off vacuum between 27 and 28 inches of mercury. The manufacturers have found that for the highest vacua a slightly different port position is desirable and units can be furnished for either normal or high vacuum service.

Equipment Developments in 1931

Part III—Instruments and Recorders

Representatives of the leading manufacturers of instruments and recorders used in the pulp and paper industry were invited to submit brief reports showing the new developments brought out in their respective industries that are finding application in the paper industry.

Pulp Mill Instrumentation at Longview

The modern idea in pulp mill practice is to eliminate the greatest of variables, the human factor. Therefore the trend has been away from simply providing the operator with a calibrating device, registering current conditions which would cause the human machine to manipulate valves, etc. The new idea is to install instruments which will perform a three-fold function: register current conditions; automaticaly activate the controls within predetermined limits; and provide a permanent record of operations at a given point.

The high standards of quality and the exacting specifications now demanded of the pulp manufacturer by the paper industry

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have made it imperative that rule of thumb be supplanted with rule of instrument. Satisfactory production can only be assured if full information of the state of the manufacturing process is available.

Since the whole aim of the Pulp Division of the Weyerhaeuser Timber Company has been toward the production of pulp of superlative quality, unusual care was exercised in selecting instruments for process control. More than a day-to-day knowledge of conditions was essential. What Weyerhaeuser's engineers developed in collaboration with engineers of The Foxboro Company in the way of an instrumentation system is believed to surpass previous pulp mill practice in the diversity and thoroughness of application in a desire to achieve the goal of pulp uniformity.

Starting in the acid plant, records of temperatures in the sulphur burners are obtained with Englehardt recording pyrometers. From this point onwards throughout the plant, practically all of the instruments for recording and controlling process conditions were supplied by The Foxboro Company of Foxboro, Massachusetts.

Accurate control of water to acid towers is made easy with the aid of a recording orifice meter installed near the six-way valve, and a record is kept of temperature of the cold gas as it leaves the cooler.

Probably the most complex process encountered in the manufacture of pulp and paper is in the cooking of sulphite pulp, and in many respects the instrumentation in the digester house is as unique as it is complete. To insure uniform conditions of pressure and superheat in the process steam, automatic pressure and temperature controllers are installed near where the steam main from the boiler house enters the cook room, and a recording and integrating flow meter gives a record of the total steam consumption in the digester house. Installed near the master control board, there is a double panel on which are mounted six recorders to show the temperature, pressure and liquid level in each of the two accumulators.

The usual recording thermometer is installed on each of the six 15-ton digesters, but there the usual procedure has been departed from for, instead of the conventional controller for maintaining the desired pressures within the digester by controlling the steam input, with manual control of relief, provision has been made for automatic control of steam input and of relief as entirely separate problems. Close control of digester pressures is maintained by a pressure "Stabilog," operating a controlled valve in the top relief system, on each digester.

With control of digester pressure maintained at a constant, irrespective of steam input, it becomes possible to maintain a steady flow of steam at the rates necessary to produce the desired temperature curves.

One digester is equipped with a flow "Stabilog" which gives full automatic control of the steam input and a chart record thereof, and the flow meters on the other five digesters are so arranged that the "Stabilog" feature readily can be added.

In the machine room the same general control procedure has been followed. The proper drying of pulp is a very exacting process and in order to insure the most favorable conditions throughout the drying cycle, multiple control has been adopted in the different sections of the Minton vacuum drier. In addition to removing the condensate from the rolls, the Sylphon system is depended upon to maintain proper heat balance conditions between the first and second sections. Primary control of the first and second sections, and independent control of the third section are effected by Foxboro pressure recorder-controllers, the instrument on the third section having a range of 0-40 pounds absolute to permit control at low steam pressures.

Recording and indicating vacuum gauges are applied on the machine casing, and a recording gauge with a range of 0-40 pounds absolute is installed on the steam header to each section of the drier rolls. A desuperheater recorder-controller is installed to provide uniform steam conditions, and a recording and integrating flow meter measures the amount of steam used by the machines.

Recording and indicating liquid level gauges are installed in stock tanks, blending tanks, white-water tankage, etc., in locations to suit the convenience of operators, and the instrumentation picture is completed by nine recording thermometers installed in the primary and secondary bleach tanks.

In addition to the instrumentation mentioned, exact control of operations is aided by the use of scales and consistency regulators installed at strategic points. Wherever materials are introduced into the process, weights are taken and recorded. For example, chemicals introduced into the filter system for water treatment are weighed. Sulphur and limerock are weighed as they go into consumption. Bleach chemicals are automatically weighed and the amount of time of their introduction is recorded. Consistency regulators and water metering devices control stock dilution in process and measure the quantities of water added at different points.

Charts from all of the various operations are received by the technical control department the day after they are made, where they are computed and interpreted, and the character and extent of the records thus available readily enables those in authority to keep unusually close check on process conditions to the fullest possible extent and to make desirable changes therein with a minimum time loss.

Anti-Ambi Thermometer

Extreme accuracy and freedom from the effects of ambient temperatures are the two outstanding characteristics of the new "Anti-Ambi thermometer" recently developed by The Foxboro Company.

This new Recording Thermometer gives true bulb temperatures at all times irrespective of summer heat or winter cold. The instrument case and connecting tubing may be subjected to temperatures which vary as much as fifty or even 100 deg. F., either slowly or rapidly, and yet the pen will remain perfectly steady, recording the bulb temperature.

The instrument is unique in construction, being based on a new interpretation of an old and proved principle. It contains no cams, compensating levers, bi-metallic strips, nor retarding action of any kind.

A special construction feature is found in the small bulb. The thermometer is so designed that it can make use of a sensitive bulb as small as one inch long. This feature will be found very useful particularly in measuring temperatures in pipes.

The "Anti-Ambi thermometer" is designed for use on temperature ranges up to and including 250 deg. F., but will undoubtedly find its greatest field in those applications where the temperature to be measured is not greatly different than room temperature, such as bleaching tanks, beaters, stuff chests and other similar applications in the pulp and paper industry.

Relative Humidity Instruments

During the past year, three relative humidity instruments of particular interest to the paper industry have been brought out by The Foxboro Company. They are the relative humidity recorder, the relative humidity controller and a combined temperature and relative humidity recorder.

These instruments are particularly adapted for the measurement and control of relative humidity at temperatures below 120 deg. F. The actuating movement is a special membrane that can be calibrated very accurately, the effect of temperature being negligible.

The relative humidity recorder and the combined temperature and relative humidity recorder are particularly adapted for use in cutting and finishing rooms of paper mills, where a knowledge of humidity conditions is essential. They are also adapted for

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use in specially conditioned rooms for testing paper, as a check on the conditioning equipment.

The relative humidity controller, which is a relative humidity recorder plus the air-operated controlling device used in all standard Foxboro controllers, maintains humidity by automatically controlling spray heads either through an air or water valve.

The Improved L & N Potentiometer Pyrometer

The Leeds & Northrup potentiometer pyrometer has long been under the scrutiny of its makers with a view to simplifying still further the use of the potentiometer in industry and of broadening still more the scope of its application.

Both objectives are achieved in "Micromax," the improved L & N potentiometer pyrometer which was announced in September, 1931. It not only makes the potentiometer pyrometer fully-automatic and free from periodic adjustments, but makes it much faster in operation. It increases both the sensitivity and the robustness of the sensitive element of the potentiometer. It makes potentiometer accuracy and reliability available for temperature control in plants of any size and with the least skilled operating personnel.

The basic feature of the potentiometer is its direct-balance method of measuring the millivolts that represent temperature. It is actually a direct electrical balance. The standard side of this electrical balance had heretofore to be adjusted daily or oftener, if the measurement was to be in keeping with the high accuracy of which the potentiometer is capable. Also, the mechanical action of the balance required occasionally adjustment if the record was likewise to be up to potentiometer standard.

The improvements which have now been effected consist in making the instrument standardize itself, not on a daily basis, but at short intervals of every 45 minutes or less, and of building in a balancing mechanism whose action is unaffected by wear, so that even periodic adjustments are unnecessary.

Incidental to the improvement of the balancing mechanism, two additional improvements have been effected which are not only of immediate value in a large number of pyrometer applications, but which still further increase the scope of use of this instrument. These include micro-sensitivity of the "Micromax" balance, with no sacrifice in the stability for which the L & N potentiometer has always been famous. They include rapidity of action which makes it possible for pen or print wheel to travel the entire width of the 9⅞" chart scale in less than 22 seconds.

As a result of these improvements, the "Micromax" now offers large and small plants alike an instrument which can be placed at the point of temperature control, or at some remote point with equal facility, and which will measure accurately and dependably, wherever placed, without daily attention. The standard side of the balance is now kept automatically at standard value, while the balancing device itself is independent of wear. As a result, the instrument needs no daily attention and can be installed with assurance that there can be secured the many advantages of thoroughly dependable temperature control within limits which can be made as close as the most exacting plant practice requires. There is no penalty in the form of daily attention, no fear that operators may neglect the heretofore necessary but now banished adjustments.

Continuous automatic recording and controlling of the pH value of the water supply or of white water are greatly facilitated by the use of the new L & N flow-type quinhydrone electrode. The continuous sample to be measured flows through the electrode, where the quinhydrone is added from an alcohol-acetone solution. This gives an instant and complete dispersal of quinhydrone throughout the sample stream. This electrode is used with the standard L & N "Micromax" recorder or recording controller for pH.

Quick Acting Feed Water Control

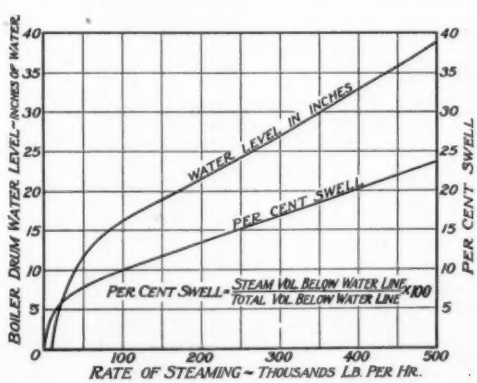
To provide adequate feed water control for modern steam generating units having relatively small drum water storage capacity and where rating changes are often very rapid, a quick-acting feed water control system is imperative.[4]

During recent years, higher boiler pressures, smaller boiler drums, the extensive use of water-cooled furnace walls, higher rates of steaming, rapidly fluctuating loads and the more common use of fuels burned in suspension, such as pulverized coal, oil and gas, permitting almost instant changes in rate of steam generation, have all contributed to complicate the feed water control problem.

Within the past ten years the amount of water storage in a boiler has been reduced from approximately one pound to .2 of a pound of water per pound of steam generated per hour at maximum rating. Furthermore, the modern unit with water-cooled furnace walls has only about one-half as much of its water storage in the drum as compared with the average boiler of ten to fifteen years ago. Due to this change in relative water storage capacity of boiler drums, it would only require about 1½ to 2 minutes to evaporate all the water out of a modern boiler drum if something should happen to the feed water supply when operating at maximum rating. Such a unit permits a feed water control only about one-tenth the time in which to function upon a change in condition, as compared with the older boilers.

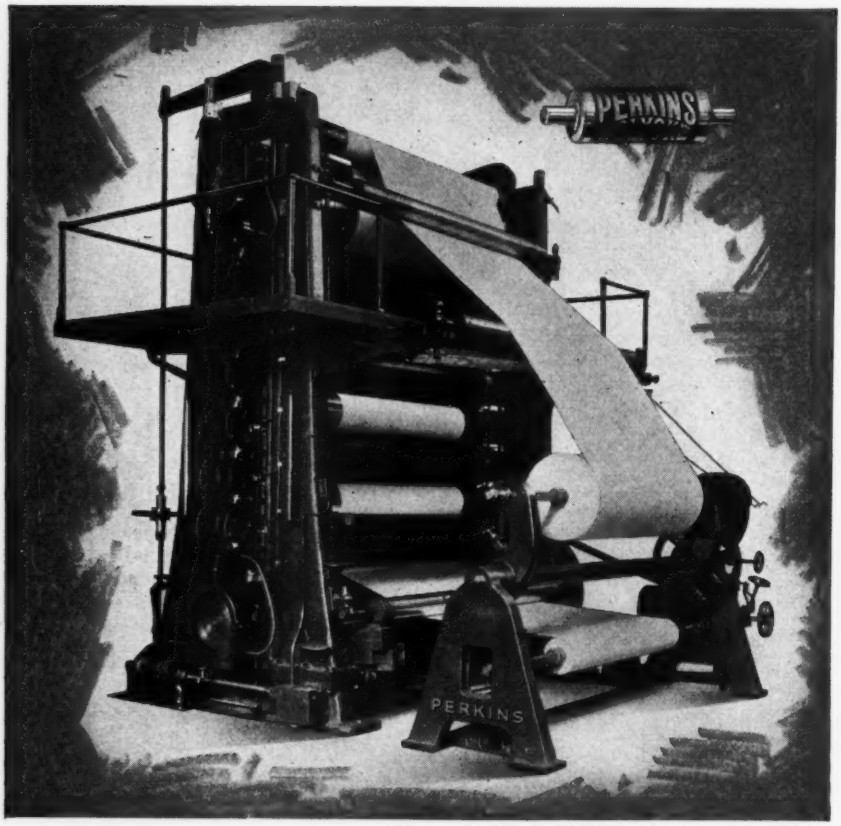
With the increased rate of steaming of modern boilers; a very much greater percentage of the volume below the surface of the water is occupied by steam. This was found to be approximate 21 per cent in the case of a 2600 h.p. cross drum boiler equipped with water-cooled furnace walls, as indicated by the curves in Fig. 1. Since only 15 to 20 per cent of the total volume of water in a modern boiler is within the drum at normal water levels, it is evident that the drum water level will be seriously affected by changes in the rate of steaming. Feed water control for boilers of this type cannot operate very successfully in the ordinary manner from an indication of level alone, due to the fact that the water level is not a correct indication of the actual quantity of water in the boiler. A feed water control for boilers of this type must be extremely fast in operation to keep the level within normal limits during large changes in load. In some cases, the only possible way to maintain the water level within safe operating limits is by means of a control which will maintain a high water level at high boiler ratings, thus providing increased storage so the level will not

[4] Contributed by H. M. Hammond, Bailey Meter Co., Cleveland, Ohio.



BOILER WATER LEVEL VS. RATING FOR 2600 H.P. CROSS DRUM BOILER EQUIPPED WITH WATER COOLED FURNACE WALLS AND WITH CONSTANT WEIGHT OF WATER IN BOILER (84,000 LBS.)

FIG. 1



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drop below the water wall tube connections or below the drum when "shrinkage" takes place following a reduction in steaming rate.

Extreme variations in level may be caused by sudden fluctuations in load. An increase in load, for instance, resulting in a slight drop in steam pressure is immediately followed by increased steam generation due to the heat stored in the boiler water. This will cause the water level in the boiler drum to rise momentarily due to the increased volume of the steam bubbles below the water level. A feed water regulator operating from water level alone will tend to close during such an increase in boiler rating. Similarly, a sudden decrease in load will result in a drop in boiler drum water level due to the decreased volume of steam bubbles below the surface of the water. This will cause a so-called "single-element" feed water regulator functioning from water level to increase the flow of water to the boiler. Such a regulator is likely to hunt with fluctuations in the rate of steaming, and is therefore unsuited for controlling feed water flow to a large boiler unit generating high pressure, high temperature steam and operating at several hundred per cent of rating.

A "three-element" feed water control system has recently been developed to meet the stringent requirements of present day boilers. The three elements from which this control is operated are steam flow from the boiler, feed water flow to the boiler and water level in the boiler drum. In order to nullify the effect of "swell" and to maintain the rate of feed water input more nearly equal to the rate of steam output, this control functions primarily from steam flow but is modified slightly by water level when necessary, to hold the level within the desired limits.

As indicated in Fig. 2 a combined recorder for feed water flow and boiler water level, and an adjacent recorder for boiler steam flow, which may be the steam flow mechanism of the standard Bailey boiler meter, supplies complete operating information for boilers which require careful feed water control. The three elements of steam flow, feed water flow and boiler water level are coordinated by means of linkage, as indicated diagrammatically in Fig. 3, to operate a Selsyn sending device through a torque amplifier.

The linkage may be adjusted so that the water level in the drum is permitted to vary during normal operation, in accordance with the "swell" corresponding to the boiler rating. This insures maintaining a more nearly constant weight of water in the boiler instead of a constant water level. A low water level at low boiler ratings provides room for expansion with increased rating thereby tending to eliminate the possibility of moisture carry over. A correspondingly high boiler water level at high ratings also provides protection against a sudden loss of load with the consequent shrinkage of volume. Such an adjustment insures carrying sufficient water in the boiler drum to

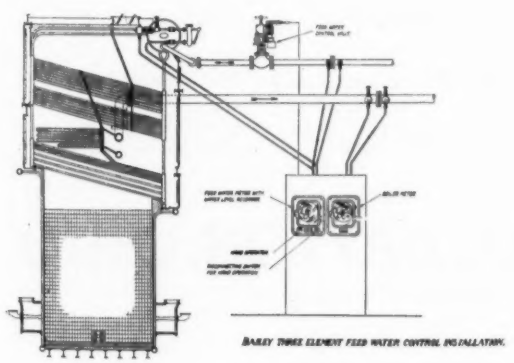

FIG. 2

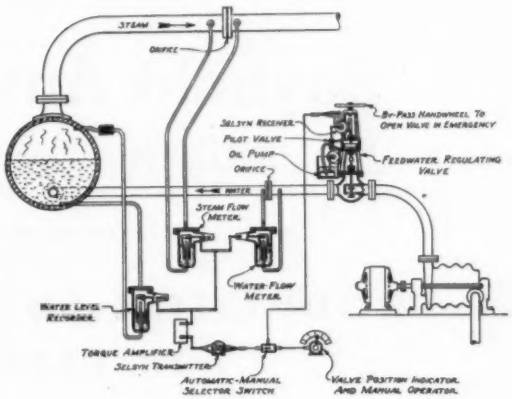

FIG. 3

seal the water cooled furnace wall circulating tubes at all times. The system may also be adjusted to maintain a substantially constant water level in the drum at all times. This is usually desirable in the case of extremely high pressure boilers due to the fact that the specific volume of the steam approaches that of the water so that the "swell" becomes negligible.

The Selsyn method of electrical transmission is used as the connection between the flow meters, which are the primary source of control, mounted on the boiler panel board, and the feed water regulating valve. A torque amplifier, controlled by the movement of the connecting linkage between the three elements, turns the Selsyn sending unit at a rate proportional to the requirements for feed water. The receiving Selsyn motor, mounted on the flow regulating valve in the feed water line, accurately follows every movement of the sending Selsyn and in doing so moves a pilot valve in the flow regulating valve from its neutral position. This applies oil pressure to the proper side of the operating piston which opens or closes the valve to secure the required rate of flow. As the piston moves, the frame or stator of the receiving Selsyn is rotated in such a way that the pilot valve is returned to its neutral position and the flow regulating valve is held in the new position.

The Selsyn hydraulic feed water control valve, shown diagrammatically in Fig. 3, is provided with its own motor driven oil pumping unit mounted directly on the valve, resulting in a self contained unit. This eliminates the necessity of extensive oil piping and the possibility of undesirable oil leakage.

While boilers operating at pressures from 1200 to 1400 pounds per square inch do not seem to be troubled with level variations due to fluctuations in rate of steaming, the small drum volumes which, for economical reasons, are included with these boilers, require feed water control which is fast in action. The increased amount of power required to operate high pressure feed control valves and the decrease in sensitivity of ordinary methods of level indication with increased pressure, requires amplification of power between the level indicators and the valve. The Selsyn hydraulic system described, admirably meets these requirements by providing a control which responds quickly and accurately to both small and large changes. Sufficient power is always available for operation of the valve.

A valve position indicator may also be placed on the operating panel board below the meters so that the operators may know the position of the feed water control valve at all times. A hand control is also incorporated which permits operation of the control valve independently of the automatic control. This only involves the operation of a switch, after which the valve may be positioned manually through the use of a knob on the valve position indicator.

A Bailey three-element feed water control valve, designed for 1600 pounds pressure service is a fully-balanced tight-seating

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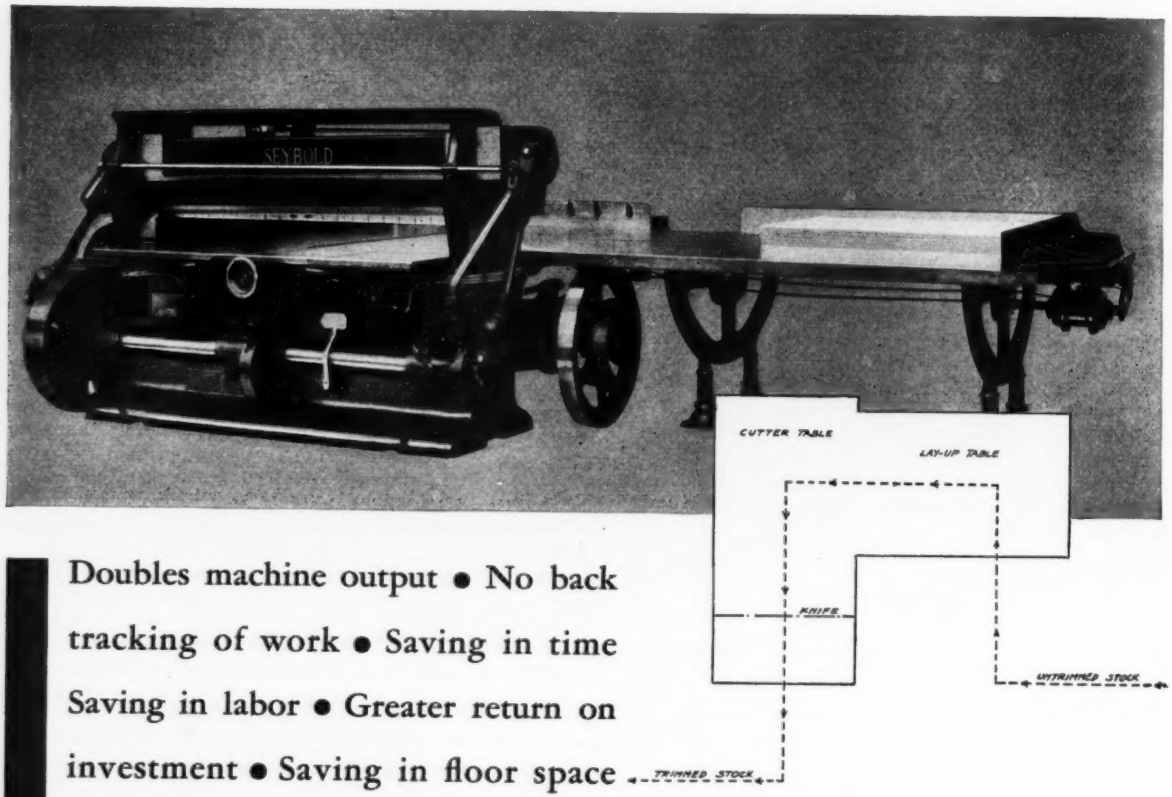

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valve similar to the one used in the standard Bailey thermo-hydraulic feed water regulator. It has a valve cage which is easily removable for inspection or grinding and which is provided with ports to give a straight line flow characterstic.

Grinder Temperature Control[5]

As an aid to the operators and a record of unit operation for the superintendents a few mills have installed recording thermometers. The bulbs of these instruments have been installed at various points in the stone pit, and the recorders made chart records of the stock temperature in the pit, which enabled the operator by manipulating a hand valve on the shower supply line, to maintain the grinding temperature closer to the desired point than was possible without this record.

The use of recording thermometers brought up the problem as to the proper location of the recorder bulb as well as the most suitable type of bulb and instrument to use. A check on the efficiency of this application developed the fact that the location of the bulb greatly affected the value of the chart record produced. Some installations were made with the bulb located in the shower end of the stone pit; this meant that the bulb affected by the cold shower water was not an accurate record of the average stock temperature in the pit, but only of that portion of it affected by the discharge from the shower pipe.

Other installations were made with the bulb located on the bottom of the pit directly beneath the grinder stone. Bulbs located at this point were often covered with slabs and stock that accumulated on the bottom of the pit, and, being in a comparatively dead spot, did not react to changes in the temperature of the stock flowing from the stone pit to the screens. Various types and lengths of bulbs were used; many of them located in the bottom of the stone pit were broken and torn away from the connecting tubing by the rakes and bars used in cleaning the slivers and slabs from the pit. Records made with instruments equipped with a short bulb usually about 6 inches long, installed in a stone pit from 30 to 60 inches wide did not represent the true temperature of the stock, as many times the flow of stock, due to piling up of slivers and slabs, was diverted from the point of bulb location to other points of the overflow weir. This meant a fairly uniform temperature line, due not to the efficiency of the control methods, but to the fact that the bulb was not reacting to actual changes in stock temperature.

The action of the pulp mill operators in endeavoring to control the temperature of the stock, first by intermittent readings with an indicating thermometer and later with continuous records from a recording thermometer, was an indication that the value of uniformity in the grinding process was realized and considered an important phase of efficient grinder operation. This led to the development, by Taylor Instrument Company's engineers, of the first successful application of automatic grinder temperature control.

After considerable research work covering primarily the proper bulb design and bulb location suitable to various type grinders and some changes in a standard Tycos temperature recording regulator, a successful application was made on a Waterous hydraulic type grinder several years ago. This original instrument installed on three different grinders in the same plant to check its efficiency on different grinders, has been in successful operation ever since the day it was originally installed.

Further studies of grinding temperature control have developed the fact that variations in grinding temperature materially affect the freeness, color, and tensile strength of ground wood fiber; further that changes in freeness of the stock due to variations in grinder temperature affect the results obtained in processing the stock in the jordans, beaters and screens; affect the character of its flow under the slice and the action of the suction boxes, suction rolls and presses in their contact with the sheet.

Stock produced on grinders controlled with the Tycos pulp grinder temperature regulator is noticeably free of coarse or bundled fibers caused by grinding at low temperatures and objectionable flour or fine pulp produced when grinding at extremely high temperatures. Stock produced at one plant and used for molding in various pulp products, has been found to dry more uniformly to a desired shape after the grinders had been equipped with the Tycos system of control. The mill superintendent at this plant also noticed a material increase in the production of the grinders; this is undoubtedly due to the fact that by controlling the grinding temperature at a definite point, the amount of water used is fairly constant and the grinding stone is operating under conditions that are very uniform.

An important item in connection with temperature control in producing ground wood pulp is that uniform temperature eliminates, to a great extent, the normal damage to stones caused by rapid expansion and contraction, as the temperature varies from one extreme to the other when hand control is used. Close control of grinding temperature also materially lengthens the normal life of a natural stone by reducing the number of burring operations. One mill operator has been able to operate a natural stone for 26 hours without reburring it, as compared with 11 hours before the Tycos control was installed.

Control which has been called the most important requisite of a properly coordinated organization is nowhere of greater importance than in a pulp mill, as the quality of paper made from the pulp produced in the pulp mill is dependent almost entirely on the quality of the pulp.

The instruments and application methods developed by the Taylor Instrument Companies for controlling wood pulp grinding temperature, embodies an instrument of great sensitivity and a regulator bulb location that hampers in no way the usual operating activities of the worker. The nature of the control is constant and within the limits of $\pm$ 1 deg. F. variation of any predetermined temperature. The control point can be changed at will by the operator and in starting up after a shut down the temperature can be brought up gradually to the operating point.

The Tycos system of automatic temperature control for wood pulp grinders places the regulator bulb or thermal sensitive element where it belongs, where it is adjusted as the stone wears smaller in diameter, where it records and controls accurately and continuously yet is protected from damage, without interfering in any way with the operation of the grinder. The installation is fully covered by U. S. Patent No. 1,806,238 and Canadian Patents Nos. 254,887 and 331,574. The Taylor Instrument Companies feel that the development of this application is a worth while contribution to the art of paper making. Installations are now being made on grinders of various sizes and types.

[5] Contributed by C. D. DeMers, Taylor Instrument Co., Rochester, N. Y.

Paper Manufacture Progress Report*

We will include in this report such matters as our close cooperation with the wire manufacturers in setting standards for wires and the publishing of common abuses to bring about longer life.

The development of a tensiometer for the tension or stretch roll that will show the tension at all times is another object of the committee.

In the paper presented by R. W. Pattison and the chairman, we have tabulated data covering porosity of felts as regards water removal to felt conditioners. We felt that information of this type would be of value to the association.

An expression of opinion is invited throughout the paper, and it is the verification or otherwise of our opinions that will allow us to proceed along the right lines, and we look to you members for a discussion.

The committee intends, when time permits, to take up drier felt study.

We have found that better results may be obtained by having the whole committee concentrate on one problem at a time.

L. M. Yoerg, Chairman,
American Writing Paper Co.

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.

Announcement

The new Lime Recovery Plant of the Bogalusa Paper Company, Inc., at Bogalusa, La., will be Mount engineered and equipped throughout.

In it will be incorporated the experience gained over a period of nearly forty years devoted to the manufacture and handling of alkalies and alkali products. Its unique features of design and construction should be of general interest.

The latest type of Mount Rotary Vacuum Filters, of all iron construction, will be used for washing and drying the strong caustic sludge, direct from the settling tanks, preliminary to reburning.

For thirty years these rugged Filters have been giving remarkable service under the most trying conditions of operation.

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Pumping Wood Pulp and Paper Stock*

By M. M. Klosson[1]

Increasing knowledge of the physical and chemical properties of paper stock and their effects on the laws governing centrifugal pump performance has made it possible to produce centrifugal pumps to handle stock more efficiently and at higher consistencies than heretofore thought possible.

With the tendencies of the paper mills toward the handling of stock at higher consistencies for more economical results, the pump engineer must understand not only the more important factors affecting centrifugal pump performance, but likewise must understand the various important phases of the paper process. The physical and chemical changes that take place in stock at each different step of operation must be given more careful consideration with increase of consistency, in order to select a suitable pump. After the pump is selected, it is equally important to have the pump properly installed. Occasionally the paper mill encounters conditions wherein pumps of identical make, characteristics and service do not give identical results because of some change in the characteristics of the stock or condition of installation.

One problem of this kind may be mentioned to illustrate the point. A certain paper mill used a high consistency pump to feed beaters with unbleached stock at 6 per cent consistency. Actually, the pump handled the stock for more than a year at a consistency varying up to 8 per cent. Later the system was changed to soda pulp and it was found that the same pump, under identical operating conditions, could not handle the soda stock above about 5 per cent consistency. After careful study of the new stock, a new rotor, properly designed, made it possible to handle this soda stock at the required consistency.

Stock of from 4 to 4½ per cent consistency is no longer considered very high because of the many successful pump installations handling soda, sulphite, kraft and paper board stock above 6 per cent in some special cases, up to 8 per cent consistency. However, these remarks are not intended to convey the impression that all kinds of stock can be pumped at such high consistencies; in fact, the chemical characteristics of some paper stock are such that they present a real problem even at 4 to 4½ per cent consistency. Stock carrying size, considerable air, and other gases in suspension, cannot be handled at as high consistency as the stock in which these elements are absent.

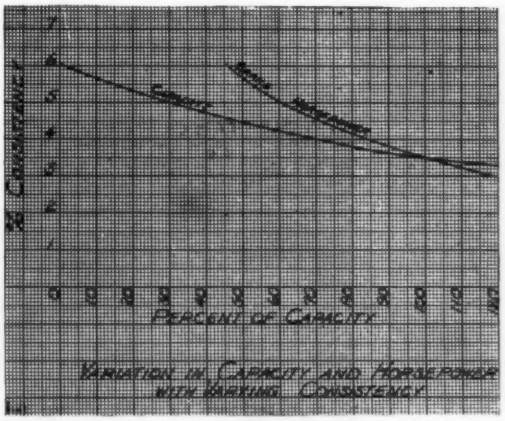

FIG. 2

Pump Selection

Frequently the trouble lies, not in the characteristics of the stock, but in the pump itself. In such case, the pump is usually selected for the highest obtainable water efficiency instead of stock efficiency, and is expected to reproduce water performance when pumping stock. No allowance is made for the internal hydraulic losses in the pump, which increase rapidly with increased consistency of stock. With internal pump losses disregarded, the pump, depending on the design, may fail to develop sufficient head to overcome the resistance of the system for the required capacity.

Fig. 1 shows what would take place if the pump were selected with internal hydraulic losses disregarded. This performance shows the actual variation that existed and took place in a double suction pump when carefully tested while pumping water, and also tested when pumping 4 per cent ground wood stock under identical operating conditions. This figure clearly indicates that a pump should not be selected on water, but rather on stock performance. Water, and especially water efficiency, is a very misleading basis. It will be noted that the pump delivers about 3000 g.p.m. of water against a 70 foot head with 76 per cent efficiency, and cannot deliver more than 2400 g.p.m. against the same head with not over 62 per cent efficiency when pumping 4 per cent stock.

If this pump had been selected for 3000 g.p.m. on a water basis, it would be about 20 per cent lower in capacity and about 26 per cent below water efficiency. It is evident from these disclosures that it is necessary to consider internal hydraulic pump losses, and where necessary, to charge them against the pump performance.

Generally a larger impeller, if one can be installed in the pump, and a larger motor correct such troubles. However, this does not give the user the efficient installation originally expected.

Another source of trouble lies in the incorrect allowances made for internal hydraulic pump losses. One common method employed is the use of a constant percentual correction, independent of head and capacity, taking only stock consistency into consideration. This method introduces appreciable error and considerable risk for the user. Such method of correcting for the difference between water and paper stock performance may cause low head pumps to fail to meet conditions, and high head pumps to develop too much head and consume more than the actual power required.

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*Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932. Written discussion of this paper will be welcome and should be sent to M. H. Teoze, 200 Fifth Avenue, New York, N. Y.
Contribution of the Heat and Power Committee.

[1]Chief engineer, Buffalo Pumps, Inc., North Tonawanda, N. Y.

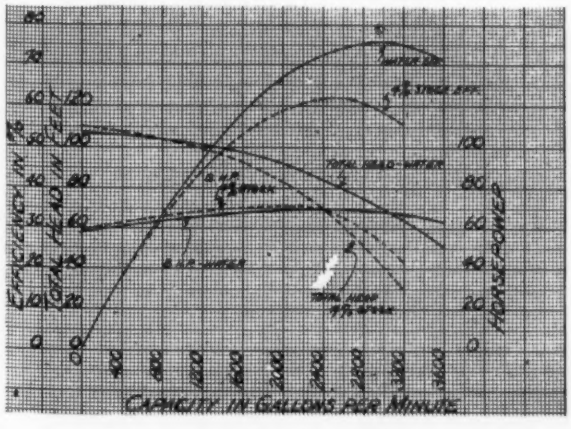

FIG. 1
Relative performance of pump handling water and stock of 4 per cent consistency.

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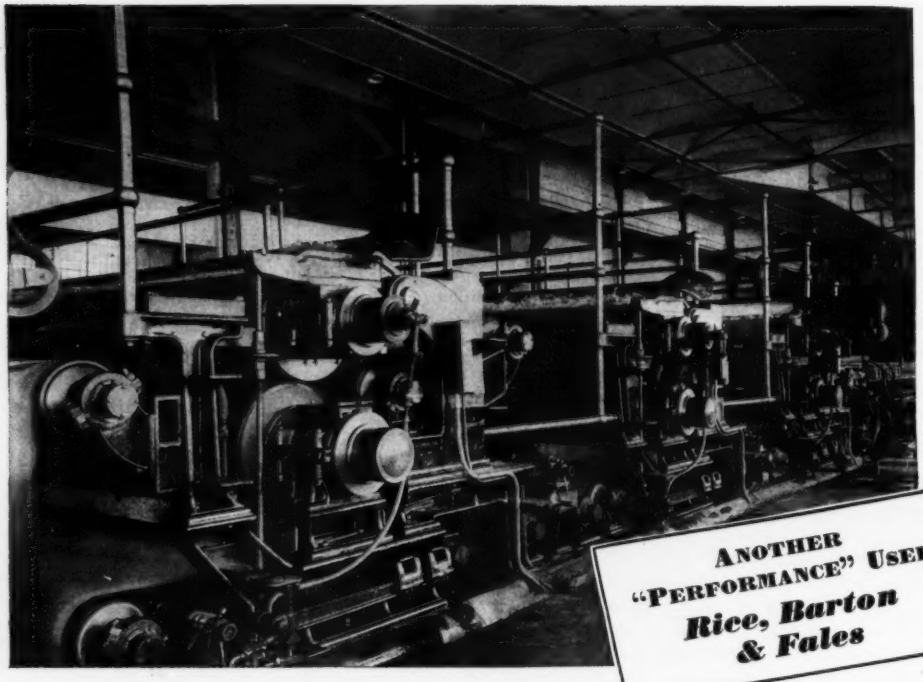

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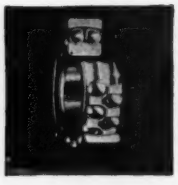

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Water Performance

In selecting a paper stock pump, the user is not interested in the performance of the pump when operating on water. He realizes that such results cannot in all cases be reproduced on stock, and that the higher the consistency, the more variation will exist between water and stock performance. The user is solely interested in the actual results and efficiency that will be obtained under actual conditions of installation in the mill.

To meet such demand, it is necessary to design and select pumps independent of water performance. All factors affecting the pump performance can then be reduced to a minimum to give the highest obtainable efficiency under actual operating conditions.

The importance of proper pump selection and careful consideration of various factors involved may be further appreciated by studying Fig. 2. This chart shows actual test results on an installation where the consistency varied from about 3½ to approximately 6 per cent. Whereas this chart applies to a given installation and can be considered only approximate for other installations, nevertheless it gives a good indication of how rapidly the capacity and horsepower may increase and decrease with varying consistency of stock. It will be noted that for a variation of from 3½ to 4½ per cent consistency, there is about 50 per cent variation in capacity and over 25 per cent variation in power consumption

In general practice, the installation is not checked for such possible variation in capacity and power consumption. The importance of checking each installation for extreme conditions that may exist cannot be over-emphasized, if disappointments are to be averted. Usually, major operating difficulties can be avoided if the pump is selected for the highest head necessary to meet the highest consistency conditions, and the motor selected to meet the highest capacity that can be pumped through the system at lowest consistency.

Figs. 3 and 4 show a Buffalo pump designed for highest stock efficiency. Fig. 5 shows the performance of this pump, one of which is installed in one of the eastern mills, feeding a battery of 22 beaters with 5 per cent sulphite stock through a discharge line about 560 feet long.

Installation Factors

The curve is the result of special and important tests and shows the variation that can be expected in a system with increase of decrease in consistency. The test also clearly indicates the possible increase in capacity and increase in power that may be expected, and the factors that must be considered in designing such an installation.

The power chart shown in Fig. 6 shows the actual power characteristics of the pump during the normal operation when idling or feeding one or more beaters. The sharp vertical lines indicate conditions when beaters are being fed. The horizontal lines represent power consumed when the pump is idling and pumping a constant volume through the return line. Usually on an open impeller pump, where the internal wedging action and wear take place, the power demand is very irregular. If internal construction is used, as in this case, to eliminate internal wear and loss of efficiency, the power curve is exceptionally smooth and clearly indicates that no internal wear or rubbing is taking place in the pump.

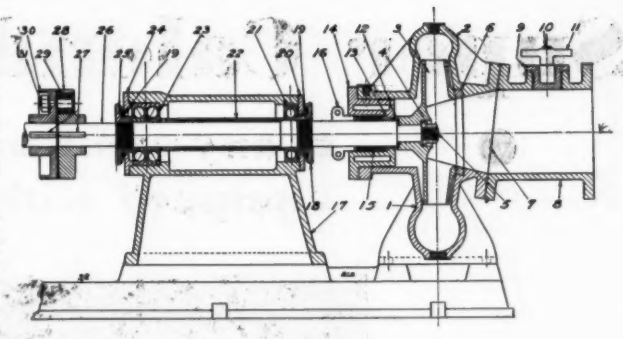

FIG. 4

Split Shell Paper Stock Pump in Section. 1, Shell—Bottom half. 2, Shell—Top half. 3. Runner. 4, Runner nut. 5, Runner nut locking screw. 6, Clearance ring. 7, Gasket. 8, Suction piece. 9, Hand hole cover. 10, Cover bolts. 11, Hand tightener. 12, Runner key protecting ring. 13, Stuffing box bushing. 14, Stuffing box. 15, Packing. 16, Gland (in halves). 17, Bearing stand. 18, Bearing nut and flinger. 19, Oil seal. 20, End plate. 21, Bearing—Single row. 22, Shaft sleeve. 23, Bearing—Double row. 24, End plate. 25, Bearing, nut and flinger. 26, Shaft. 27, Coupling keys. 28, Coupling—Driven half. 29, Coupling bushing. 30, Coupling—Driving half. 31, Coupling bolt and nut. 32, Base plate.

Fig. 7 shows another pump that is operating under unusually extreme and interesting conditions. This shows the pump elevating unbleached sulphite stock to a screw press in a bleach plant.

The column of paper stock on the right shows the consistency that the stock reaches at times. When the pump is stopped for a short time, the water tends to drain out of the stock, increasing the consistency to the point that, when the pump is started, a solid column, as shown, rises out of the vertical discharge line. This column rises until it strikes the board above the tank, then breaks up. By that time, stock of normal consistency of about 8 per cent is being pumped. At no time during the three years of operation did the pump fail to clear the discharge line against the unusually high resistance.

Because of rapid increase of friction head with increase of stock consistency, the resistance imposed on such a pump is frequently very high. In many cases these pumps are now operating against heads above 100 pounds per square inch (231 foot head).

Experience has shown that the usual types of open impeller

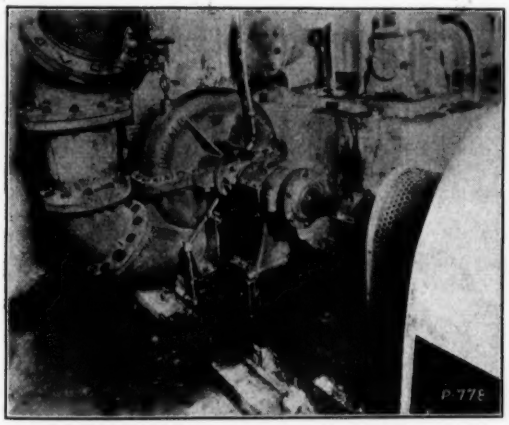

FIG. 3

Pump at Consolidated Water Power and Paper Company, Wis., handling about 800 g.p.m. 7-8 per cent sulphite stock (75 h.p.—850 r.p.m. motor).

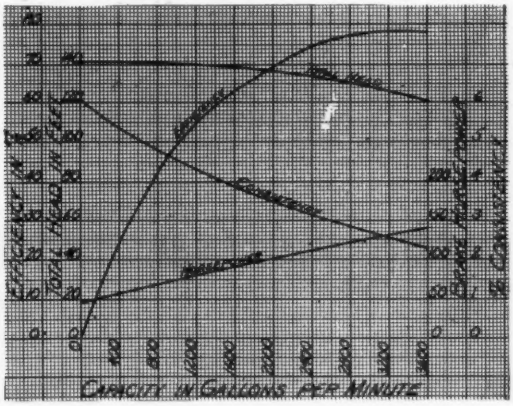

FIG. 5

Typical performance curve of high consistency pump.

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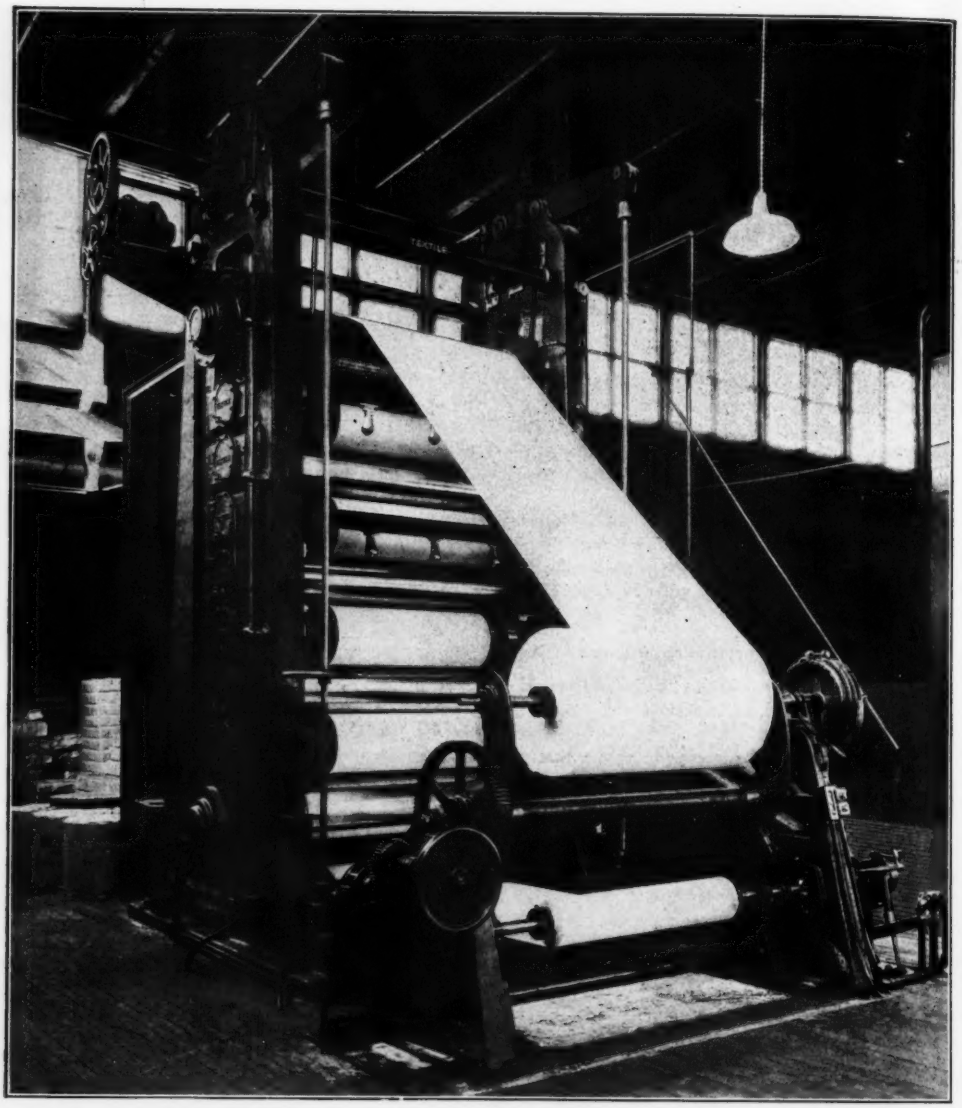

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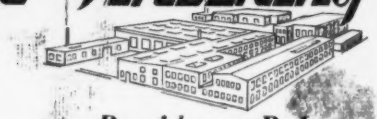

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stock pumps with removable side plates are not satisfactory for high pressure and high consistency conditions. The impellers and removable side plates would wear rapidly, soon causing high internal hydraulic losses and resulting in rapid reduction in pressure, capacity and efficiency. To maintain initial efficiency, it was necessary to replace frequently both the impeller and side plates at the same time.

It was found that the fibres would wedge between the impeller and the side plates, causing not only wear due to abrasion but also vibration which, in spite of rugged construction, disturbs the packing and necessitates frequent adjustment and replacement of the packing

To overcome these conditions, a thorough investigation was made. The investigation, involving extensive experiments, revealed that a certain type of enclosed impeller could be employed to eliminate practically all the close running clearances inherent in open impeller construction, thus eliminating the internal wear, the loss of capacity, pressure and efficiency, and reducing the maintenance to a minimum. After several years of operation on sulphite, kraft and soda stock ranging up to 7 per cent consistency, some of these impellers and shells were examined for wear and it was found that no signs of wear were evident on the shells and that the wear on the inlet rings was not sufficient to change initial performance.

Pumps featured with this type of impeller and construction have been in operation for more than four years. Actual tests, comparison of results, and the striking reduction of maintenance cost have convinced some of the largest kraft, soda, sulphite and paper board mills of the general superiority of such construction.

In many cases, in both sulphite and paper board mills, this type of pump replaced the reciprocating pump and gave more reliable and more flexible service.

We have mentioned some of the particularly difficult stock pumping installations, but to show the range of application that has been met successfully, we wish to call your attention to the following information.

Pumps are operating in a kraft mill up to about 6½ per cent consistency and handling kraft on every phase of operation, including high density bleachers in which the high consistency stock

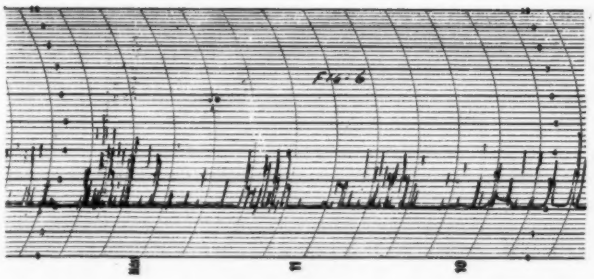

FIG. 6

is washed down in lumps and must be broken up and handled by the pump.

In sulphite and soda mills, the pumps are handling stock up to 7 per cent consistency and against pressures of about 100 pounds (231 feet) in supplying beaters and hydrators, in circulating, and on breaker beater service. Stock is being pumped to screw presses at a consistency over 8 per cent to obtain the maximum efficiency of the press. The pumps have the desired characteristics to meet conditions of operation in a bleach plant where stock of irregular, high consistency is handled.

Non-Clogging Impeller

For paper board service the pumps are provided with a special non-clogging impeller to pass all foreign material that is carried in suspension. Some mills are 100 per cent equipped with pumps of this type on every kind of service. On three different breaker beater installations, not one instance of clogging was experienced in more than three years of operation. Reciprocating pumps have been replaced in some cases, with a considerable saving in first cost and a greater reliability and flexibility. Paper board stock is being pumped at consistencies above 6 per cent and against pressures as high as 100 pounds. Beaters are being fed in 1½ minutes through discharge lines 400 to 500 feet long, with pressures of 100 pounds.

With reference to the special non-clogging impeller, the writer

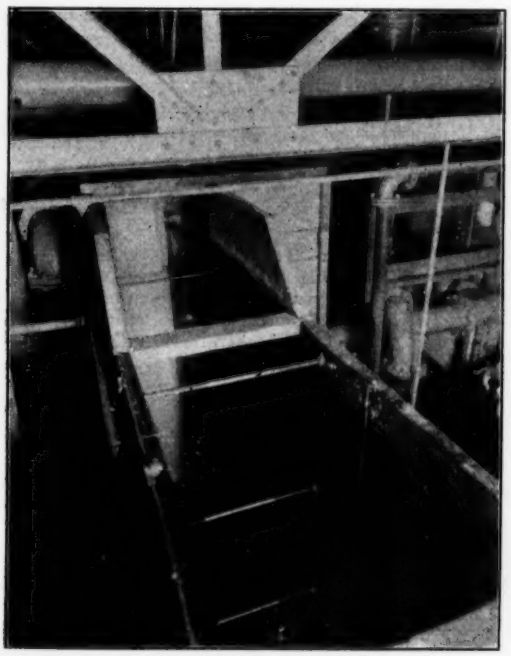

FIG. 7

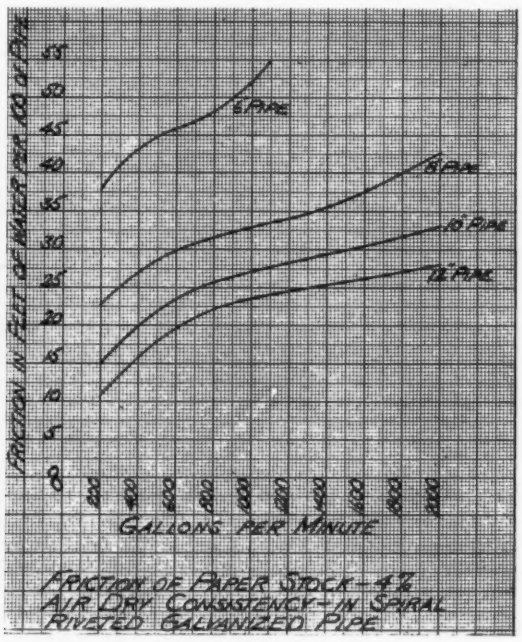
6 PIPE
8 PIPE
10 PIPE
12 PIPE
GALLONS PER MINUTE
FRICTION OF PAPER STOCK - 4% AIR DRY CONSISTENCY - IN SPIRAL RIVETED GALVANIZED PIPE

FIG 8

wishes to state that the so-called non-clogging impeller with generously rounded impeller vanes at the inlet, as is frequently used on sewage, is satisfactory in some cases on paper board stock, especially on breaker beater service. There is no special advantage and in many cases there is a decided disadvantage in using such an impeller instead of the conventional open or closed impeller on clear sulphite, soda, ground wood or kraft stock at any point of operation, even on the blow pit service where slivers, knots and other foreign matter must be pumped.

Careful investigation discloses the fact that properly designed pumps do not clog, but may fail to handle stock beyond a certain consistency, and that the inability to handle the stock is not due to clogging, but to design, conditions of installation, or chemical conditions of the stock.

Another phase of the paper stock pumping problem that should be given more careful consideration is the selection of suitable suction and discharge piping. Since the friction head is practically always higher than the static lift, there is no other industry where so much power is consumed to overcome friction as in the paper industry.

It is safe to say that no other industry wastes so much power because of excessive friction head due to incorrect selection of pipe size.

Fig. 8 is plotted to show the friction head for flow of paper stock through 100 feet of various sizes of piping. This figure gives reliable indication of how rapidly the friction changes with size of pipe and how important the friction losses are in the paper industry.

From experience gained in the field and laboratories, it was found that it is necessary by the company represented by the writer to carry a broad line of pumps to meet various combinations of stock conditions most economically and satisfactorily. The types of pumps illustrated and described have proved most admirably suited for the most important paper stock installations.

Operation of Continuous Caustic Recovery Plants*

By W. E. Piper[1]

Chemical plant processes may be classified as of two distinct and very different types; intermittent or batch operations, and continuous operations.

Explanations are scarcely necessary. The advantages of continuous straightline quantity production, fully appreciated and realized, have made the fortunes of our biggest American businesses.

The older, costlier, more wasteful batch methods of caustic recovery in wood pulp mills have given way to the continuous system to such an extent that it seems pertinent to present some observations from practical experience in the design, construction and operation of continuous plant equipment.

Now, no process is truly continuous. Just as a curved line may be conceived as made by joining the ends of many very short straight lines, or a straight line as a string of small dots close together, so with our so-called continuous operations.

This practical lack of continuity necessitates our huge piles of wood, our storage bins and tanks, warehouses, and varied sorts of enclosures for raw and finished materials.

Within the mill we have almost made the procession continuous. In go the logs upon the drag, through barker and chipper, the chips hustle over screens, then pause at the digesters. From blowpits to bleachers the pulp's progress may be unchecked, but there it is halted, and again, for the last time, at the beaters.

Of the pulping and sheet forming operations that used to be all intermittent, only three remain so—digestion, bleaching and beating—in the most modern mill design; and the modern mill engineer has designs upon all three, to bring them into step with the swift procession.

All the chemical processes may now be made continuous in the paper mill. Batch slaking, causticizing, settling, filtering and lime re-burning are past chapters in this serial. Storage is required only to forearm against accidental interruptions to operations, and to attach the continuous processes to the discontinuous ones, also to provide for fluctuations.

Storage

For instance, if our continuous cauticizing system requires fresh lime at the rate of 25 tons per day, and it is desirable to unload a 50-ton car of lime in a day, we must provide at least 25 tons storage, and it would be wise to allow for at least three days' interruption of traffic.

Lime should be stored in such a way that it will be easy to handle, and will not air-slake. The objections to air-slaked lime are that it is dusty to rehandle, and it is partly carbonated. Lime stored in large lumps takes more space.

For continuous slaking, the lime must be crushed to about ¾ inch size to accommodate the automatic feeder. It is best to crush it upon arrival and store it in a tight hopper-bottomed bin connected with the feeder. This avoids air-slaking and rehandling. The hopper should have at least 45 degree slope, and steeper if headroom permits.

The crushed-lime bin should be covered not only to prevent air-slaking, but to exclude steam, if it is near the slaking operation, and also to keep out foreign material, bolts, bricks and other objects that will stop the lime feeders.

There will be one bin for fresh lime, one for reburned lime. The conveying arrangement should be flexible so that the bins may be interchangeable, and that reburned lime may be diverted to lump lime storage space if necessary.

Other points where storage is required will be:—

Between the dissolvers and green liquor clarifier, a heated insulated storage tank for green liquor. (In soda mills, this is for soda ash liquor ahead of cauticizers.)

Between classifier and cauticizers, storage for milk of lime.

For weak liquors ahead of dissolvers (or leaching tanks).

For strong liquor ahead of digesters.

For washed mud ahead of filters.

The amount of storage will depend upon individual cases. For instance, milk of lime need be stored only in sufficient quantity to provide for changing from one pump to another.

Hot liquor tanks should be covered and insulated. An excellent insulator for an outdoor tank is a 4-inch brick wall with 1 inch air-space next the tank. Green liquor (or soda liquor) tanks should be heated also.

Feeding and Metering

The feeding and metering of materials is of prime importance, but extreme precision should be avoided. The nature of the operations does not call for more than 1 or 2 per cent accuracy, and precision any closer than this is not necessary.

Ruggedness, dependability, adjustability, and ease of calibration are the essentials of the feeding or measuring devices.

Lime has to be crushed to about ¾ inch to be handled well by most of the continuous feeders, whether of the weighing belt or of the oscillating gate or pusher type.

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* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.
Contribution of the TAPPI alkaline pulping committee.

[1] Chemical engineer, The Dorr Company, New York, N. Y. (TAPPI Contributing Member).

Have a gate ahead of the feeder so you can shut it off from the bin; and a spout and gate between feeder and slaker so that the setting of the feeder can be checked often. Have a scale and wheelbarrow kept there. One hundred pounds feed in three minutes equals one ton per hour. These calibrations, properly recorded, make a very good check on your lime consumption and inventory.

A closed screw conveyor is very practical for delivering the dry lime into the slacker. It does not choke up if it is big enough. The dry journal boxes usually supplied should be provided with grease lubrication, preferably by grease gun. The cover should be removable in 4-foot sections. The conveyor should project two feet or more into the slaker.

Slaking

The slaker is a horizontal cylindrical shell with coned ends. The feed opening should be 6 or 8 inches less in diameter than the discharge opening, as the slight slope on which the slaker is set does not provide much head for discharge of the lime slurry. Even so, a trough or catch-all under the feed end is a good precaution, to keep the floor clean.

Slaking liquor (usually about one half the total supply) is to be piped into the down-going side of the slaker. This decreases back-slop due to small steam-puffs and to the sticking of the lime. In one case it was necessary to use a small stream on the up-going side also, to keep the throat clear.

The slaker is designed for about 5 minutes' detention of the slurry. An accumulation of stones and heavy debris will reduce this detention, will grind the lime flocs so fine they will not settle well, and will interfere with slaking. The slaker should have lifting fins (spiralled) at the discharge end, to remove this coarse material. A cylindrical screen attached to the discharge end will send the plus ½ inch material to a waste can.

The balance of the slaking liquor is used to flush the slurry into the classifier. A branch line to the caustizers will take care of any surplus of liquor. It is not necessary to measure these quantities of liquor. The slaking should be as dry as practicable, the liquor should be as hot as possible, and a little experience will regulate the dilutions closely enough.

Considerable steam is liberated here, and natural or mechanical ventilation will be necessary. A hood at each end of the slaker is advisable.

All hot pipes should be insulated. The liquor overflowing the classifier is a partly causticized milk of lime. It is usually pumped to the causticizers. A surge tank should be provided, to take care of interruptions due to changing pumps, etc. A 6x6 foot tank should be large enough. It serves also as a metering tank for the flow of liquor.

Duplicate pumping units should be provided in all cases. Hot caustic is bad for pump packing.

Causticizing

In the caustic reaction, heat and contact are the important features. Contact is a result of time and agitation. The function of temperature also is contact among the molecules, since their kinetic energies and therefore their velocities are greatly increased as the temperature rises. Unfortunately steam coils do not last long in kraft causticizing tanks. Have the liquor as near boiling as possible before it enters the causticizers, insulate all exposures well, and you will get good causticities. Live steam jet connections should be provided in bottoms of causticizers for emergency.

Agitation is important, but it should not be too long nor too violent, or it will cause the carbonate to be too fine to settle well. From one to one and a half hours is sufficient, depending on several factors such as the temperature, strength of solution and activity of the lime. For soda mills, an air lift agitator with raking arms to draw the lime sludge into the air-lift column is very satisfactory. For kraft mills the air-lift is replaced by a propeller in a draft tube, drawing upward. The lower end of the draft tube carries the raking arms.

The reaction should be completed before the first clarifier is reached, for best clarification of strong liquor. Since this reaction is reversible, it is incomplete in strong solutions, and is more nearly complete in weaker ones, therefore there will be a secondary reaction in the second thickener which carries weaker liquor. Even an excess of lime does not affect this situation greatly. Three to five per cent excess of lime is sufficient to get maximum causticity in a given time.

The disturbance in second thickener due to this reaction is offset by the more rapid settling rate of solids in weaker solution; but the clarity of weak liquor is not so important, as it is used for dissolving or slaking.

Clarification

Conservation of heat and proper regular removal of the mud are the important points in clarification, under normal conditions. However there may be times when the lime mud will not settle, just as was true of the batch system.

Such trouble is usually due to one or both of two causes:

First, the reburned lime may be so poorly burned that its availability is low, and the mud content is greatly increased due to the building up of a circulating load of fine inert material too fine to be rejected at the classifier.

Second, elements detrimental to settling may have accumulated. These elements may be magnesium or silica. The magnesium comes from the new lime, the silica from sand and from the kiln lining, as silicates of various sorts. The magnesium will appear at its worst as magnesium hydrate.

The remedy for both causes is to send to storage some of the reburned lime, increasing the proportion of new lime until good conditions are restored, and then look to the magnesium content of the new lime, and improve your reburning operation. Involved in the reburning operation is the caustic content of filter cake fed to the kiln. It should never be more than 2 per cent and the less the better. Caustic not only eats the kiln lining, but in so doing it makes sodium silicates and aluminates which cause troubles in causticizing and settling and filtering later on. They also are suspected of lowering the availability of the reburned lime by fluxing or glazing the particles of lime something after the manner of an egg-shell. This concept has not been proven, but could be investigated microscopically, and I commend the research as worth some one's while.

Green liquor clarification and sludge washing are governed by the same general rules as similar operations for white liquor. The amount of sludge is much less, and it does not filter readily. Therefore it is better washed in counter current thickeners. Due to the small volume and fluid consistency of the sludge, a multiple compartment washing thickener in one unit serves this purpose admirably.

The filtration and filter-washing of lime mud on continuous vacuum filters need not be discussed at great length, as it is a longer established practice. Monel metal cloth seems to be the accepted filter medium, although chrome iron cloth is being tried. Plenty of vacuum pump capacity is essential. We think 4 cubic feet per minute per square foot of filter is the minimum.

A water-jacketed screw is a very good lime cake feeder into the kiln. Oil or gas seems preferable as a kiln fuel. A long kiln is better than a short one of the same volume; but dust losses rise with velocity of gases.

Leaving the kiln, lumps over ¼ inch should be diverted by a screen and sent to the fresh-lime crusher, instead of going into the storage bin.

We hope these notes may be of interest and help to those who are operating continuous caustic recovery plants, or who intend to have one.

Synchronized Super-Calender and Winder Drives in the Paper Industry*

By C. W. Drake[1]

With a view of obtaining a better understanding of the problems encountered in the design and operation of combined super-calender and winder drives, this paper also gives a brief résumé of the more recent and common types of drive for individual super-calenders and winders.

Fundamentally the process of super-calendering is much the same as it was five years or even twenty-five years ago. The desired finish on the paper is still obtained by running it through a stack of dissimilar rolls under suitable pressure. The most marked and radical changes have occurred only during the last few years and as in most other industries these have been along the lines of producing a commercial and satisfactory product at a lower cost than previously. Although it is acknowledged that paper costs start or are largely controlled in the pulp mill or beater room the question of profit or loss on super-calendered paper may be very largely determined by the method of handling after leaving the paper machine. The lineshaft driven calender with one threading and one running speed had very definite limitations of production and the introduction of the individual motor drive and especially the 2-motor drive with an over-running clutch for threading-in speed constituted a marked step in advance. Many such drives are giving good service and a few are still being installed but the open gears, the mechanical clutches and the physical effort required to operate them all tend to definitely limit the increase in power and speed of such drives.

Recent mechanical improvements in these 2-motor drives such as the use of self contained gear units in place of open gears and refinements in the control have greatly improved the safety and efficiency of such drives. When it is quite definitely known that only one calender is to be installed this type of drive may prove somewhat lower in first cost but if two or more calenders are used then some of the newer types of drive will be found more satisfactory and advantageous.

At the present time practically all new super-calender drives installed for high speed operation use only one driving motor

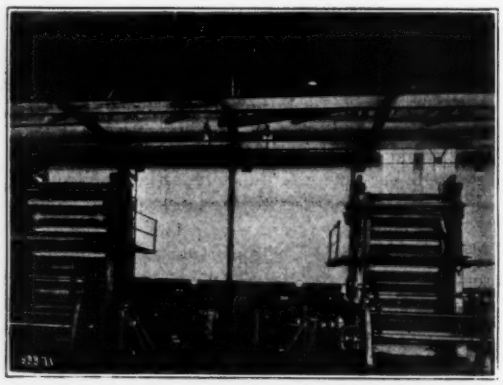

FIG. 1
Two-motor super-calender drives installed in 1904 and still operating.

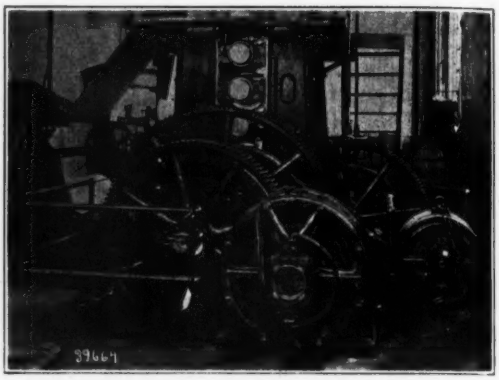

FIG. 2
Close view of drive in Fig 1 showing motors and gears.

which is connected to the lower roll of the calender through a self contained speed reducer. This eliminates the hazard and noise of open gearing over running clutches etc., increases the efficiency and materially reduces the maintenance required. With a simple mechanical drive of this type it is evident that all speed control from the slow threading to the maximum running must be obtained from the motor and as the maximum speed is steadily increased the range between the threading and the maximum running speed steadily increases. On many old drives the ratio of the maximum to the threading speed was only 10 or 12 to 1 while now a ratio of 20 to 1 is not uncommon that is, 50 feet threading and 1000 feet maximum running speed.

These rather exacting requirements of a low, but constant threading speed, with smooth acceleration to the maximum or to any running speed have been met successfully by two electrical systems, one using an alternating current wound rotor motor, and the other a direct current motor for the calender. The former system is known as the dual frequency since a low frequency is supplied to operate the motor at the threading-in speed and the standard mill frequency is used for all other speeds. The direct current system is known as the variable voltage system since all changes in speed are obtained by varying the voltage applied to the armature of the calender motor.

Dual Frequency System

In this system the low frequency is supplied by a frequency changer which is of the commutator type and the armature is quite similar to that used in a synchronous converter. Low voltage mill frequency is applied to the collector rings and three phase low frequency taken from the brushes on the commutator. In the case of a 60 cycle supply if the ratio of the maximum to the minimum speed is 20 to 1 the low frequency would be approximately three cycles and since this is used for threading-in speed only, one frequency changer may be used to supply the requirements for a number of calenders.

The wound rotor calender motor is of standard construction although in determining the size for any particular calender special consideration must be given to the torque required to start the calender which is often several times the running load in case ordinary sleeve bearings are used. The control equipment consists essentially of a drum type master switch suitably located near the calender and a contactor panel which may be located

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Contribution of the TAPPI equipment committee.

[1] Assistant manager, general mill engineering department, Westinghouse Electric and Manufacturing Company, E. Pittsburgh, Pa. (TAPPI Contributing Member.)

in any convenient place. The first point on the master switch connects the motor to the low frequency supply and when in this position the motor may be started and stopped from push-buttons located around the calender or reel. This enables all of the operators to cooperate when threading-in or working on the stack but when it is desired to accelerate to a running speed it is necessary to return to the control station and operate the master switch. The control equipment is so designed that a smooth transition from the low to the high frequency is obtained as well as smooth acceleration to the operating speeds. When the paper breaks in the stack a quick stop is important to prevent injury to the rolls and this is obtained by a "Stop" or "Brake" button which temporarily reconnects the motor to the low frequency supply. One of the early installations of dual frequency drive is described in the Electrical World, April 4, 1925. In this article Mr. W. H. Scott of the Kalamazoo Paper Company describes how nine calenders formerly driven by line-shafting were converted to individual motor drive using dual frequency and some of the advantages obtained

Variable Voltage Direct Current System

In this system which has been used for many years for various other applications such as paper machines, winders, etc., a motor generator set is ordinarily used to convert the mill alternating current supply to direct current and by varying the voltage of this generator from a minimum to a maximum it is possible to obtain any desired speed on the direct current motor which drives the calender. A constant voltage supply of direct current is also required for the fields of the direct current generator and motor. Since the speed of the calender motor depends directly upon the voltage of the generator it is evident that one motor generator set is required for each calender motor and this must be of sufficient size to supply the entire power requirements. With dual frequency control on the other hand all power used under running conditions is taken directly from the mill supply and the frequency changer is used only during the threading operation. From a production or operating standpoint there is little difference between the two systems but if more than one calender is to be installed the initial investment and simplicity of equipment are greatly in favor of the dual frequency system.

Winders

The problem of slitting, trimming and winding paper either in connection with a paper machine or in the finishing room has been solved by the several winder manufacturers in quite different and interesting ways. The principal difference from a drive standpoint between a machine winder and a rewinder of a given make is one of horsepower and speed so that any discussion of

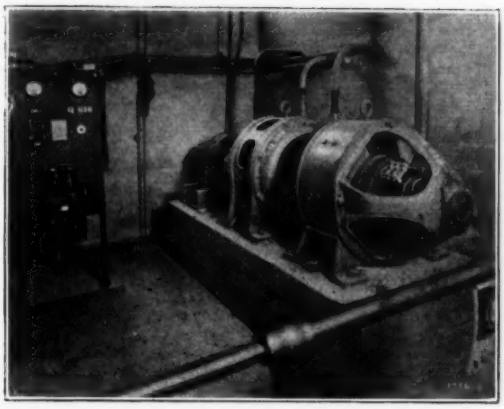

FIG. 5
Motor generator set and starting panel for variable voltage calender drive.

electric winder drive really resolves itself into an analysis of the requirements for the various types or makes of winders. Winders may be broadly classified as four drum and two drum and the two drum may be still further segregated into those using only one drive shaft and those having two shafts, that is one for each drum.

It is hardly necessary at this time to dwell on the mechanical simplicity of the electric drive using a direct connected or geared motor for each drive shaft as compared with the numerous belts, clutches, gears, etc., required to give all of the speed control necessary from one lineshaft or a constant speed motor. The principal requirements of a winder drive are that it shall be possible to start smoothly, run at a very slow speed and accelerate very gradually to any desired operating speed. Another requirement is that the rolls of paper wound shall be of suitable hardness or softness as the case may be and it should also be possible to wind all rolls uniformly. On winders having two or four drive shafts suitable means must be provided for controlling the load or power taken by each shaft or motor in order to control the above winding characteristics. Just how much the hardness of the roll depends upon the relative roll speeds or loads and how much on the tension in the sheet coming to the winder depends to a considerable extent on the type of winder and the manner of winding but this is also a subject worthy of more technical investigation. For winders equipped with the standard mechanical drive or for those having only one drive shaft the dual frequency

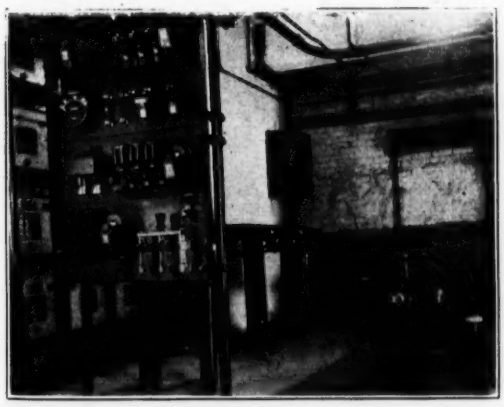

FIG. 3
Dual frequency control equipment showing contactor panel, frequency changer and transformers for same.

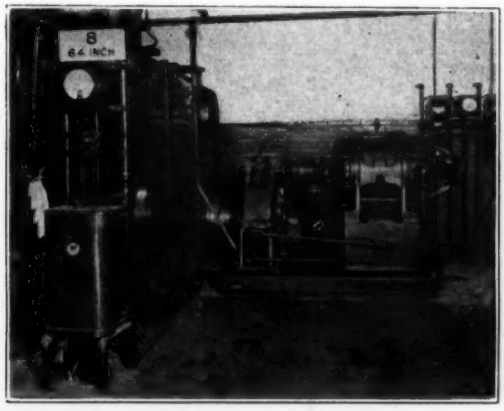

FIG. 4
Wound rotor induction motor, gear unit and drum master switch used on dual frequency calender drive.

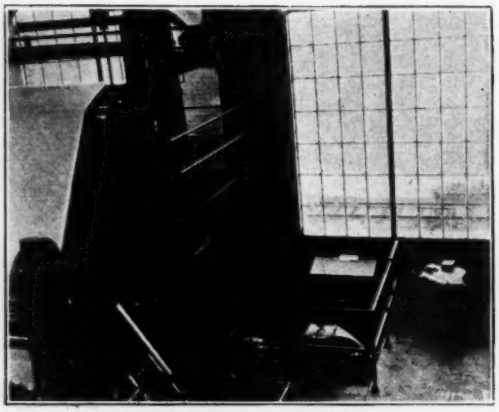

FIG. 6
Direct current motor with gear unit on large high speed calender supplied from variable voltage motor generator.

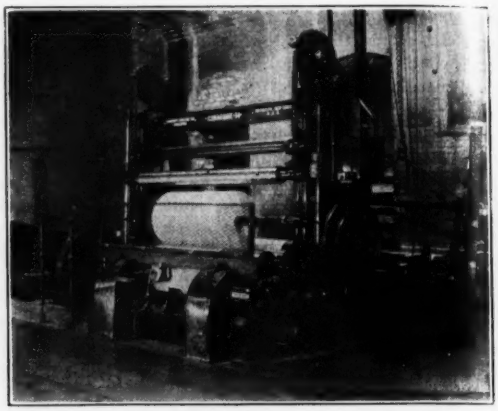

FIG. 8
Control end of winder of Fig. 7 showing speed control rheostat and "stop" button.

system makes a very simple and inexpensive means of obtaining the low and high speeds required. This scheme makes use of standard induction motors and by using the same frequency changer for a number of calenders, winders or cutters very little extra expense is involved.

The variable voltage system as outlined previously for calenders has been found to have ideal characteristics for winders and by means of one rheostat the voltage of the generator may be controlled over its entire range from practically zero to its maximum value and thus obtain any speed and as gradual acceleration as may be desired. The general scheme of control is the same regardless of whether one, two or four motors are used since if more than one motor is used they operate in parallel on the same generator and consequently start and operate in unison. The use of two or four motors however indicates that the rolls or drums are not geared together and consequently in this case it is essential that the motors be properly designed so that they inherently maintain such a division of load as has been found by experience to give the best results on any particular grade or weight of paper. On multiple motor winder drives one ammeter and one field rheostat is supplied for each motor and once it has been determined what current in each motor gives the best results it is a very simple matter to duplicate these results at any future date.

Automatic Tension Control

The tension in the sheet of paper between the unwinding reel and winder is ordinarily produced by some form of mechanical brake. After properly adjusting this brake for a new roll it should be gradually released as the roll diameter decreases in order to maintain uniform tension in the paper. With a mechanical device of this type it is impossible to determine just what tension is obtained at any one time and the number of brake adjustments during the winding of the roll and the accuracy of these adjustments depend entirely upon the operator. If the ratio of full reel to core diameter is 5 to 1 then if no adjustments were made the tension at the end of the reel would be five times as great as at the beginning. It is consequently not difficult to believe that throughout the winding of a reel the tension may readily vary as much as 100 per cent and not be noticed.

The ability to know the tension in the sheet at all times, the ability to vary this at will or automatically hold it constant at any desired value are undoubtedly desirable operating conditions. Electric generators and regulating equipment have been developed and are in operation which provide these features and although more readily applied to new drives, they may with minor modifications be adapted to existing drives. By means of a direct current generator connected to the unwinding reel the energy generated is converted into electricity and returned to the winder drive instead of being used up as heat in the brake. A very simple and rugged regulator maintains the current at a constant value, not only over the entire roll diameter but also for any winding speed. A small ammeter and rheostat similar to those used for the winder motor enable the operator to read the tension at all times and adjust it as operating conditions require.

With winders of ball or roller bearing construction it is apparent that a large portion of the power required to drive them is

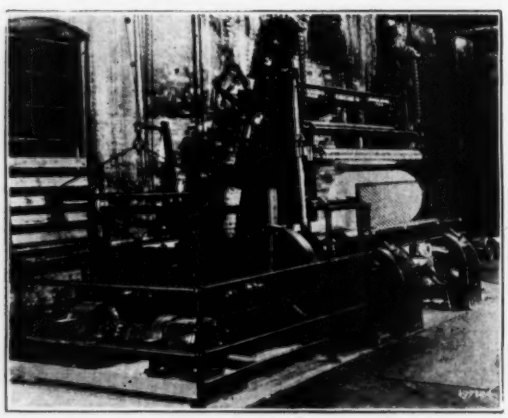

FIG. 7
Two-drum winder with one drive shaft using variable voltage control.

FIG. 9
Two-motor drive on 2-drum machine winder using variable voltage control.

represented by the tension in the sheet and consequently on wide winders operating at high speed the energy loss in brakes as well as their maintenance becomes a real problem. Many winders on news machines operating at about 3000 feet per minute take from 50 to 75 h.p. while on Kraft machines loads from 100 to 150 h.p. are not uncommon. Although the saving of energy is a factor of importance the ability to automatically hold the desired tension and thus wind better rolls of paper is of much greater importance.

Synchronized Super-Calenders and Winders

The economic necessity during the last few years of producing super-calendered papers at a still lower cost is largely responsible for the introduction of machine width super stacks operating at high speeds and finally the use of synchronized winders so that shipping rolls may be produced directly from the machine wound

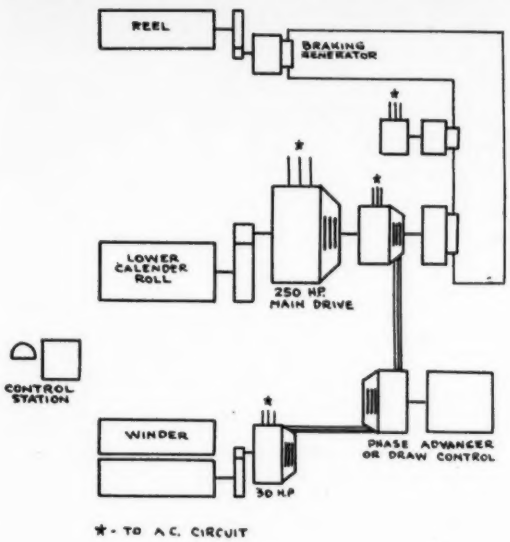

FIG. 12
Schematic diagram of Westinghouse synchronized calender and winder drive with automatic tension control on reel.

rolls. Thus the extra handling and labor of rewinding, slitting and trimming is eliminated and with an economically arranged mill material savings should be effected. Although these large high speed stacks might have been constructed with the conventional bearings it is felt nevertheless that much of the success of the new machines is undoubtedly due to the use of ball or roller

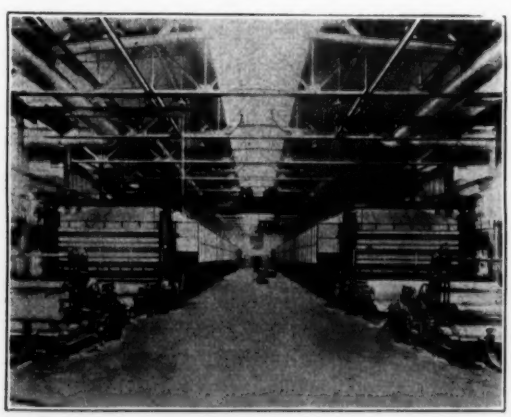

FIG 10
Winder end of two 228-inch news machines designed for a maximum of 1450 feet per minute and equipped with Westinghouse sectional electric drive using carbon pile sectional regulators. The two-drum winders have individual motors and automatic tension control.

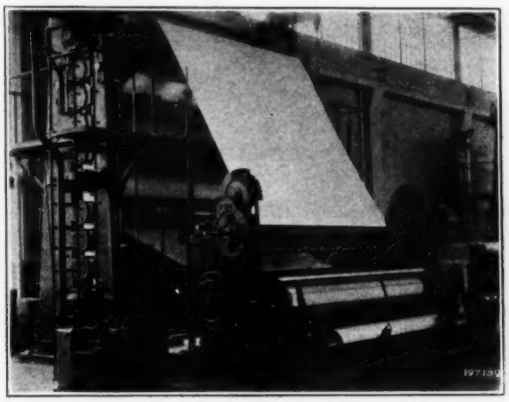

FIG. 13
General view of super-calender and winder—Bryant Paper Co.

bearings throughout. The use of such bearings not only makes a material saving in the power consumed and size of electrical equipment required but the reduced starting friction and uniformity of same is of great assistance in the proper design and operation of electrical control equipment.

A recent installation in the mill of the Bryant Paper Company, Kalamazoo, Michigan of two 160 inch 10 roll double finish supercalender with two-drum winders includes a number of new and interesting operating features. The calenders were supplied by the Textile-Finishing Machinery Company and are equipped with anti-friction bearings throughout, i.e., on top and bottom rolls as well as thrust bearings on all the intermediate rolls, five of which are cotton and the others steel. The winders are of Cameron make, Type 48 Model 9 with 160 inch drum face and equipped to wind rolls up to 36 inch diameter, and at a maximum speed of 900 feet per minute.

One complete unit consists essentially of an unwinding reel, a calender and a winder but all are electrically equipped and so connected that they operate as one synchronized machine. The schematic layout shows the main driving equipment and the principal interconnections. The main calender drive is a 250 h.p. wound rotor induction motor operating on dual frequency control, one frequency changer supplying low frequency for both calenders. The direct current generator on the reel feeds its power back to the calender through another direct current machine, the regulating equipment maintaining the current or tension as desired.

Of principal interest however is the winder drive which utilizes

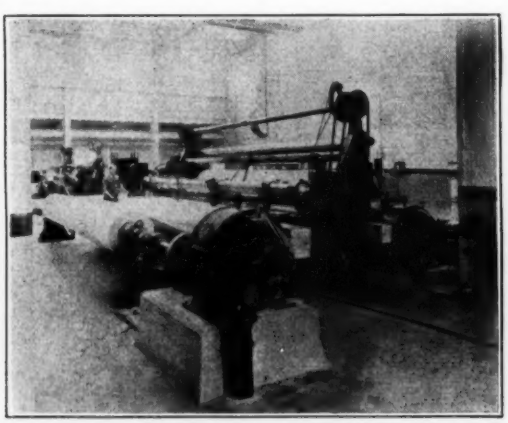

FIG. 11
One of the 228-inch two-drum, 3,000 feet winders with braking generator for automatic tension control in foreground and only one of the winder motors in sight. Operator is standing beside winder drum type controller.

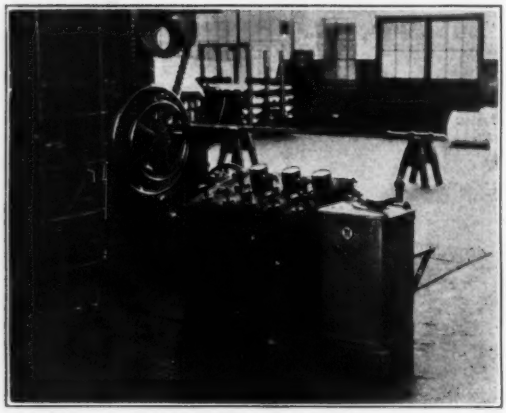

FIG. 14
Control bench—all electrical operations obtained from this point.

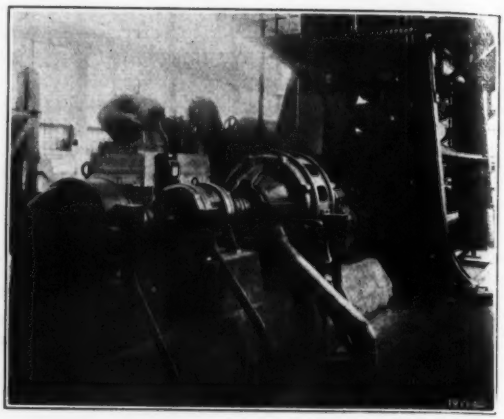

FIG. 16
Rear view showing main drive for calender and auxiliaries.

wound rotor induction motors so connected as to give a synchronous speed relation between the calender and the winder. With a drive of this type there is a definite speed relation between the calender and winder regardless of whether paper is being wound or not. On the new drives at the Bryant Paper Company a very light roll suspended by springs is placed between the calender and winder to introduce a flexible element in the draw but it in no way affects the speed or regulation of the winder. Since this roll is spring suspended, the elongation of the springs or the position of the roll in its guides is a direct indication of the tension being carried and these guides could be calibrated like a spring balance from zero up if desired.

In previous instances where winders and calenders have been operated together the winder speed did not have a definite or synchronous relation to the calender but was controlled or regulated by a rheostat driven from a counterweighted take-up or dancer roll located between the calender and winder. With such a dancer roll the tension in the sheet is determined by the difference in weight between the counterweight and the roll. By adding or removing weights it is possible to vary the tension over a considerable range but due to the friction of pulleys or sprockets and the effort required to operate a face plate rheostat, it is necessary at all times to maintain a wide difference in weight or in other words a considerable tension in the sheet in order to have the dancer roll respond rapidly to variations in paper speed. Even with friction reduced to a minimum the high inertia due to the combined weight of the roll and counterweight defeats the attempt to obtain a light tension and rapid response to changes in speed. On certain weights or grades of paper a high tension may be entirely satisfactory but on light weight or weak sheets a very low tension may be a necessity. When winding any roll of paper it may also be found desirable to change the tension several times from the beginning to the end and this involves the changing of weights on the counterweight.

With this new winder drive it is possible to wind with practically zero tension if desired, that is, with a slack sheet to the winder but this tension can be adjusted from zero to a maximum in an infinite number of steps by the operation of a small control switch. Another operating feature of this drive is the ability to inch or rotate the winder slowly with the calender stopped in order to take up initial slack in the sheet and pull the spring roll to its proper position, or to turn the roll of paper or winder when tearing off paper or putting on wrappers.

Perhaps a clearer conception of the flexibility and ease of operation of this entire equipment can be obtained by following through the sequence of starting and winding a roll of paper. Assume for instance a new reel of paper in place. The drum controller of the main drive is moved to the first point which causes the calender and winder to operate at low frequency speed. One of the small switches on the control bench is then operated which causes the reel to unwind paper so that a "tail" may be torn off to thread through the calender. The speed is controlled by turning a rheostat, using a high speed at first then slowing down until the paper speed is the same as that of the calender to permit threading. All manual effort of turning or unwinding the reel is entirely eliminated and considerable time saved.

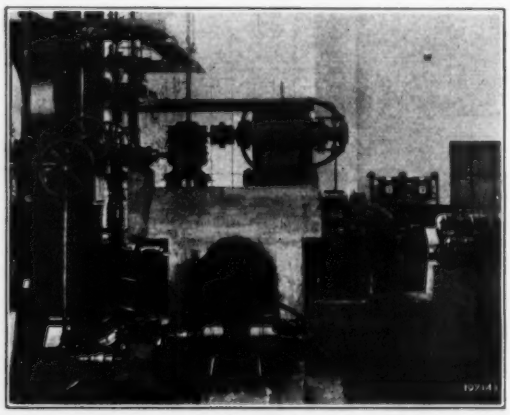

FIG. 15
Drive end showing winder motor, braking generator and main drive.

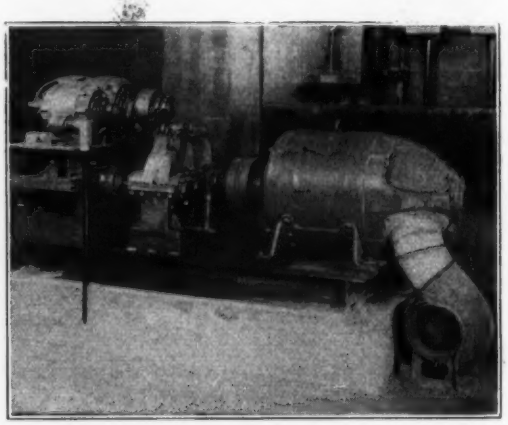

FIG. 17
Phase advancer for winder draw adjustment (installed in basement).

After the "tail" is well threaded and widened out, further operation of the same rheostat applies as much tension in the sheet as desired and holds this tension even if the calender is stopped. The paper after leaving the calender is passed over the spring roll to the winder and properly started on the rewinding shaft. At any time while operating at low speed the unit may be started and stopped from push-buttons suitably located around the machine. After dropping the rewinding shaft in place and stopping the stack the winder will probably be inched until the spring roll is in the desired position.

One advantageous characteristic of this synchronized drive is that when stopped the winder will not back up due to tension in the sheet but will hold the same tension which existed when running.

With the sheet entirely threaded through and on the winder the operator now starts the calender again and brings it to full speed as rapidly as he desires since no adjustments or attention need be given the spring roll or draw to winder. As soon as the calender is up to speed the operator takes a final look at the ammeter indicating the tension on the reel, makes an adjustment if necessary, then leaves the control bench to look after mechanical adjustments of the calender and winder, knowing that the electrical characteristics will remain constant until intentionally changed.

When a "flag" appears on the reel or it is desired to slow down to examine the sheet the operator simply moves the main drum master switch as rapidly or as slowly as he desires since all tensions or draws will remain fixed, and need no attention. Consequently a slowdown can be made to pass a bad spot and full speed regained in a minimum time. In a like manner the reel can be run down to the core and stopped with paper in the stack thus saving considerable paper and loss of time. In case of a break in the stack or any other emergency requiring a very quick stop a control switch with red handle is operated which connects the main motor to the low frequency supply and applies a strong braking effort.

From the above description it is apparent that from the control bench or pulpit, as it is sometimes called, it is possible to observe and to control practically all operating functions of the calender. The operator, standing before the bench, has a good view of both the draws and can also watch the winder and the stack. Not on the control bench, but near by are the control valves for raising and lowering the weights also for applying steam to the sheet so that these operations may be performed quickly and with a minimum effort. Although the various calender operations obtained from the control bench have been outlined above the following tabulation gives in a more concise form the functions of the various switches, rheostats, etc.

Control Functions

Main Drum Controller
- Entire speed control of calender and winder.

Pistol Grip Switches
- For Winder
  - 1—On-Off (relative to calender)
  - 1—Inch
  - .1—Raise-Lower (draw to winder)
- For Calender and Winder
  - 1—Stop (Normal or Emergency)
- For Braking Generator
  - 1—On-Off

Rheostats
- For Braking Generator
  - 1—Speed Control as motor / Tension Control as generator — Low Speed
  - 1—Tension adjustment / Under regulator control — High Speeds

Meters
- 1—Main calender motor.
- 1—Winder motor.
- 1—Braking generator.

Considering the entire unit, i.e., the reel, calender and winder the following constitute the more important characteristics or features:

Salient Features of Drive

Main Calender Motor
- Wound rotor induction with dual frequency control.

Winder Drive
- Induction motors—synchronized tie.
- Draw or tension in sheet adjustable from zero to maximum in infinite number of steps.
- Winder may be rotated or inched with calender stationary.

Braking Generator
- Provides for motorizing reel to tear off or thread paper at any speed desired.
- Provides tension under manual control when threading or at standstill.
- Provides tension under regulator control at all winding or operating speeds.
- Can be reversed to unwind in either direction.

Summary

On any machine of this size and complexity, the ease of operation or lack of physical effort required to perform the various operations has a very great effect on the ability of the operators to maintain a high machine efficiency and some very interesting production records bear out these conclusions. The ability to operate with very low but uniform and controlled tension also greatly tends to reduce the number of breaks and loss of production especially on light weight paper or on paper not uniformly dried or formed. Under such critical operating conditions the ability of a drive to function smoothly and under perfect control may mean the difference between profit or loss.

Heat Requirements for Drying Coated Paper*

By E. G. Milham[1] and Severns Balch[1]

The drying of coated paper may be conveniently divided into four periods namely, the flowing period, the setting period, the evaporation period and the cooling period. At the present time in practically all mills, the coating is applied to the paper by means of brushes or rolls, after which it is allowed to flow together with the assistance of soft brushes or smoothing rolls. The setting of the color is accomplished by passing the coated paper over an air float, or in the case of single coated paper, by passing it over a moving apron and a short series of carrying rolls before putting it into the drier.

The flowing and setting of the coating are affected by a number of factors such as the absorbency of the raw stock, the density of the coating solution, the weight of the dry coating being applied to the paper, the temperature of the coating solution and the character of the materials composing the coating solution. With all of these variables to affect the situation, it is obvious that the coating equipment must be flexible and capable of meeting the

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.
Contribution of the heat and power committee.
[1] Watervliet Paper Company, Watervliet, Mich.

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conditions imposed by the changing of these variables. It is also essential that the coating solution be adjusted to meet the limitations of the machine in such a way that the raw stock is completely and uniformly covered by the time the paper leaves the last smoothing brush or roll. In addition to this, the setting period must be such that by the time the coated paper enters the drier, it is sufficiently set to prevent further distortion such as color run, the formation of bubbles in the coating or the formation of spots.

Evaporation Period

The proportion of water to solids in coating solutions varies through a wide range; some solutions containing as much as two pounds of water per pound of dry coating and others as little as one pound. Since these proportions vary with the weight of dry coating put on the paper and with the character of the coating materials, it is evident that the drying facilities must be extremely flexible to meet these widely varying demands.

Drying Systems

At present, it is common practice to evaporate the water in coated paper by hanging it up in festoons and giving it free access to comparatively dry and somewhat warmed air. However some installations are in operation where the paper is passed over heated cylinders after the coating has been allowed to set. In still other installations, the paper is passed rapidly through a closed drier provided with rapid circulation of air at an extremely high temperature. However, since the last two systems mentioned are still in the experimental stage, they will not be considered further.

In the case of the festoon system, the undried coated paper is hung up on sticks and given free access to warm dry air. In the older installations, the heat was supplied through steam coils located directly under the festoons and the circulation was provided by exhaust fans located either above the festoons or at one side or one end. No attempt was made to provide fresh warm air to take the place of the air exhausted but the air was allowed to get in any way it could through windows, doors, cracks in the floor, etc. In the more recent installations, the fresh air flows through a heater provided with suitable devices for controlling temperature and humidity. The heated air is then led through ducts to the festoons and applied directly to the surface being dried. The moisture laden air is removed from the room by means of an exhaust fan, whence it is either run to the atmosphere or back into the fresh air heater for recirculation, as determined by the automatic control devices.

Operating Conditions

Regardless of the system used, all water removed from the paper is removed by air. Therefore the heat requirements can be discussed independently of the particular system being used.

In calculating the heat required, it will be necessary to assume certain data which, for the purpose of illustration, will be taken as follows:

The sheet will be coated on one side only.

The coating machine will run 250 feet per minute.

The coating machine will be 100 inches wide.

The length of time in the dry room will be 30 minutes which is equivalent to 7,500 linear feet of paper.

The moisture content of the raw stock and of the dried coated paper will be 5 per cent.

The coating mixture will consist of 100 pounds of clay at 95 per cent dry, 16 pounds of casein at 89 per cent dry, 3 pounds of dry soda ash and an added water content varying from 124 to 194 pounds as shown in Table I.

The weight of coating (95 per cent dry) applied to the sheet will vary from 10 to 25 pounds per ream (25 x 38—500) as shown in Table I.

The Moisture Carrying Capacity of Air

The moisture carrying capacity of air varies decidedly with the temperature as a casual glance of a psychrometric chart will show. For example, a thousand cubic feet of air at 50 deg. F. can carry not over .58 pounds of water, whereas a thousand

TABLE I

Added water per 100 pounds clay	Pounds water per pound dry coating	Pounds Water Evaporated Per Hour Coating						
		10.0	12.5	15.0	17.5	20.0	22.5	25.0
124	1.06	402	501	602	703	803	903	1004
134	1.14	432	539	647	756	864	971	1080
144	1.22	462	577	693	809	925	1039	1155
154	1.30	493	615	738	862	985	1108	1231
164	1.39	527	657	790	922	1054	1184	1316
174	1.48	561	700	841	981	1122	1261	1402
184	1.57	595	743	892	1041	1190	1338	1487
194	1.65	625	780	937	1094	1251	1406	1563

cubic feet of air at 140 deg. F. can carry as high as 8.2 pounds. The following table shows the water carrying capacity of air at temperatures varying from 0 deg. F. to 140 deg. F. at 30 inches barometric pressure.

TABLE II

WATER CARRYING CAPACITY OF AIR PER 1,000 CUBIC FEET

Temperature deg. F.	Pounds Water per 1,000 cu. ft.	Temperature deg. F.	Pounds Water per 1,000 cu. ft.
0	.07	70	1.14
10	.11	80	1.56
20	.18	90	2.11
30	.28	100	2.83
40	.41	110	3.73
50	.58	120	4.93
60	.82	130	6.36
		140	8.20

Volume of Air Required for Drying Coated Paper

To illustrate the calculation of the volume of air required for removing the quantities of water listed in Table I, the following data will be taken:

The relative humidity of the out-going air will be assumed to be 55 per cent and the dry bulb temperature 80 deg. F.

The relative humidity of outdoor air will be assumed to be 50 per cent and the temperature 40 deg. F. From these assumptions, the following will be evident:

Pounds of water per 1,000 cu. ft. of outgoing air at 80 deg. F. (1.56 × 55)	.86 pounds
Pounds of water per 1,000 cu. ft. of outdoor air at 40 deg. F. (.925 × .41 × 50)	.19 pounds
Pounds of water picked up by 1,000 cu. ft. air outgoing	.67 pounds

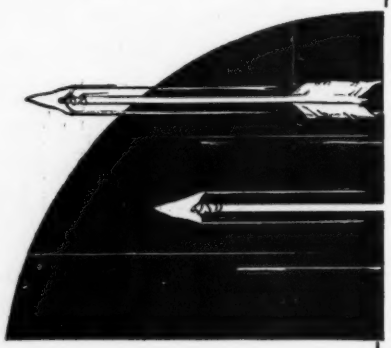
The factor .925 above corrects for the change in volume of air due to the change in temperature from 40 to 80 deg. F. It will thus be seen that under the conditions assumed above, each 1000 cubic feet of out-going air will carry from the paper .67 pounds of water or each pound of water evaporated will require 1,493 cubic feet of air. Again refering to Table I, it will be seen that a 15 pound coat carrying 1.30 pounds of water per pound of dry coating will require the evaporation of 738 pounds of water per hour which is equivalent to 738 x 1493 or 1,101,834 cubic feet of air per hour or 18,364 cubic feet per minute.

The same procedure may be used to calculate the air volume required for other sets of conditions, bearing in mind the fact that the table for water carrying capacity of air is based on complete saturation or 100 per cent relative humidity and that to find the water content of the air at any other humidity it is only necessary to multiply the figure in the table by the relative humidity.

Of course, it is obvious that either the temperature, humidity or air volume will have to be varied tremendously to meet all the evaporation rates shown in Table I. It is therefore necessary in designing drying equipment, to strike a balance which will normally average unfavorable outside weather conditions.

Heat Requirements for Drying

In calculating the heat required for drying, it is advisable to first determine the required air volume as already shown, taking into account the temperature and humidity of the outside air, the temperature and humidity of the exhausted air and the weight of water to be evaporated. The heat in b.t.u. required per hour



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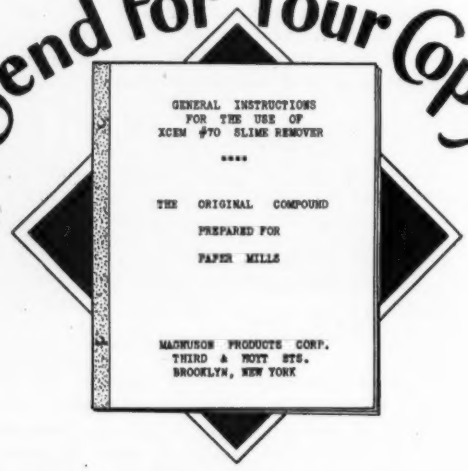

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can then be determined approximately by multiplying the weight of water evaporated per hour by 1050 and adding to this the heat lost in the exhaust air as determined by Table III.

TABLE III

HEAT LOST PER 1,000 CUBIC FEET OF AIR EXHAUSTED AT VARIOUS TEMPERATURES

Temperature of outside air, deg. F.	Temperature of Exhaust Air, Deg. F.						
	60	70	80	90	100	110	120
0	1250	1459	1668	1877	2085	2294	2504
10	1020	1224	1428	1633	1837	2042	2246
20	799	999	1199	1399	1599	1800	2000
30	587	783	979	1175	1371	1567	1764
40	384	576	768	960	1152	1344	1537
50	188	376	565	753	941	1130	1319
60	...	185	369	554	739	924	1108
70	...	...	181	362	544	725	906
80	...	...	...	170	349	525	703
90	...	...	...	...	150	330	500
100	...	...	...	...	...	148	325

The pounds of steam required per hour can be determined roughly by dividing the total b.t.u. by 990, assuming that the heating steam is under 10 pounds gauge pressure and that the condensate leaves the heater at 200 deg. F.

To illustrate the method of calculation, let it be assumed that the volume of exhaust air is 18,364 cubic feet of air per minute or 1,101,834 cubic feet per hour as in the previous calculation above. Let it also be assumed that the drier evaporates 738 pounds of water per hour and that the temperature of outdoor air is 40 deg. F. and of the exhaust air 80 deg. F. By referring to table three above, it will be found that the b.t.u. lost in the exhaust between 40 and 80 deg. F. is 768 b.t.u. per 1000 cubic feet. The calculation is then as follows:

Exhaust B.t.u. lost per hour (1,101.834 × 768)	846,208 B.t.u.
B.t.u. for evaporation of 738 pounds water per hour (738 × 1050)	774,900 B.t.u.
Total	1,621,108 B.t.u.
Pounds steam required per hour (1,621,108 ÷ 990)	1,637 pounds
Cost of exhaust steam at 15 cents per 1,000 pounds	24 cents per hour

It will be noted that no mention of loss of heat by radiation has been made. This loss, of course, depends entirely upon the construction of the dry room and the difference between outside and inside temperatures. In average mill construction, consisting of brick walls and non insulated wood roof, the radiation amounts to about .7 b.t.u. per square foot per hour per degree of temperature difference.

From the calculations, the following conclusions may be drawn:

It is essential that the coating mixture be properly applied and properly dried before going to the drier.

Drying lines must be long enough to allow an even drying at a not too rapid rate.

It is very advantageous to balance the volume and temperature of exhaust air against the water to be evaporated, in such a way that minimum loss in b.t.u. is obtained.

The heat requirements vary in wide limits depending on the weight and water content of coating being applied, the rate of application and outdoor weather conditions.

The drying of coated paper is an exceedingly small element in the cost and normally should not run over two or three cents per hundred pounds of paper coated.

While considerable progress has been made during the past few years in the technology of drying coated paper, the operation is still carried on in a comparatively crude and clumsy manner and there are plenty of opportunities for further development and refinement.

Determination of Alpha Cellulose*

Recommended Changes of "III Modification for Unbleached Pulps"

By W. R. Willets[1]

The difficulty of taking a 2 gram sample of the residue after mercerization as specified in the tentative standard method led to the routine of using the entire residue of which the weight was already known. However, the use of this oven dried residue at times rendered the peptization and solution by the 72 per cent sulphuric acid extremely difficult. At first it was thought that a simple seasoning of the alpha cellulose (residue after mercerization) under room conditions of temperature and humidity would render it easily peptized and acted upon by the 72 per cent sulphuric acid. While this was found to be true for the large majority of pulps, certain residues were not easily peptized. Consequently the solution of the cellulose was not complete and the residual lignin figure was too high. In such cases even if the error was not very great the difficulty of filtering the lignin residue was considerable.

Therefore it was decided to moisten the residue from the mercerization test with 5 cc. of water, stopper, and allow to stand over night in the weighing bottle in which it was weighed. This renders the cellulose in a form which is easily peptized by the sulphuric acid. However, if this is done a definite allowance must be made for the excess water since adding 50 cc. of 72 per cent sulphuric acid to the cellulose already containing 5 cc. of water will result in a volume greater, and an acid strength less, than that desired. It has been found that 45 cc. of 76.76 per cent sulphuric acid (sp. gr. 1.695 at 15 deg. C.) when added to the cellulose which already contains 5 cc. of water will give a total of approximately 50 cc. of 72 per cent sulphuric acid. The determination of residual lignin can then proceed in the usual manner. The following calculations will explain the foregoing:

45 cc. of 76.76 H_2SO_4 weighs	76.275 grams
5 cc. of water weighs	5.000 grams
Total weight	81.275 grams

45 cc. of 76.76 H_2SO_4 contains 76.275 × .7676 or 58.549 grams absolute H_2SO_4

$$\frac{58.549}{81.275} = 72.04 \text{ per cent } H_2SO_4 \text{ or approximately 72 per cent } H_2SO_4$$

72 per cent H_2SO_4 has a specific gravity of 1.638 (approx.) and 81.275 grams will have a volume of:

$$\frac{81.275}{1.638} = 49.6 \text{ or approximately 50 cc.}$$

It is therefore recommended that Section III, "Modification for Unbleached Pulps," be amended as follows:

In the case of unbleached chemical wood pulps the alpha cellulose figure should be corrected for lignin remaining in the residue after mercerization. The following is adapted from the method developed by the U. S. Forest Products Laboratory, Madison, Wisconsin. (Cf. Paper Trade Journal Vol. 87, No. 25, December 20, 1928, page 61.)

The residue from the mercerization test is treated with 5 cc. of water in the original weighing tube in which it was weighed, stoppered, and allowed to stand over night at room temperature. The residue is then removed to a beaker and treated with 45 cc. of sulphuric acid, sp. gr. 1.695 at 15 deg. C. (76.76 per cent by weight), and the digestion allowed to proceed at 25 deg. C. for 16 hours. The mixture is transferred to a 2 liter Erlenmeyer flask, diluted with 1570 cc. of water, covered with a watch glass and boiled for 2 hours, maintaining a constant level by the addition of boiling water. The residue is then filtered through a tared Gooch or frittered glass crucible, washed with hot distilled water and dried to constant weight at 100-105 deg. C. The alpha cellulose figure is corrected by subtracting the percentage of lignin residue thus obtained.

* The original tentative standard method was published in Technical Association Papers, Series XIV, p. 121: 1931.

[1] Member TAPPI, Western Electric Co., Kearny, N. J.

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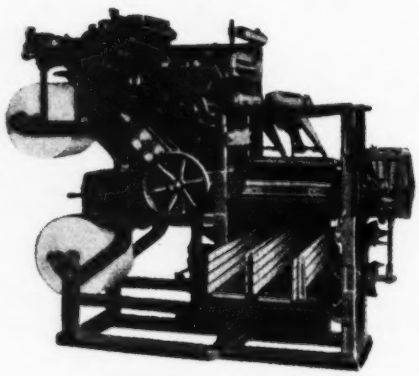

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Acquires Tolhurst Machine Works

P. G. Mumford, president and chairman of the board of directors of the American Machine and Metals, Inc., announces the purchase of the Tolhurst Machine Works, Inc., of Troy, New York, makers of the Tolhurst extractors. Tolhurst Machine Works, founded in 1852 by W. H. Tolhurst, has specialized in the manufacture of centrifugals for the chemical, textile, sugar and laundry fields and, of later date in the waste reclamation and paper industries. The Tolhurst Machine Works, Inc., will retain its own name and be a separate and distinct subsidiary of the American Machine and Metals, Inc. Its general sales and executive offices will be located at 100 Sixth avenue, New York.

It is interesting to note that Tolhurst Machine Works in its earlier days, specialized in the production of wood patterns and development of new machinery, most of the work being done for inventors. C. H. Foster, in his article "Some Early Laundry Machinery History," states that the first machine constructed for the purpose of utilizing centrifugal force for throwing surplus liquid from solid material was developed for handling sugar. It was invented by a Mr. Weston, who came from Honolulu in 1866. A crude affair, it was of the type that has come to be known as the suspended centrifugal.

"In 1885," says Mr. Foster, "Mr. Tolhurst hit on an idea of the flexible step cup which is the special feature of the Tolhurst construction. Gradually, markets for the Tolhurst self-balancing type were developed, the machines subsequently becoming especially popular in textile mills where the loads are necessarily heavy and where it is difficult to balance them. Since that time the application of extractors to various lines of work has gradually grown until the machines are used for a wide variety of purposes."

Swedish Mills Fairly Busy

The turnover in the Swedish paper market has been fairly good and most of the mills have orders on hand for six or eight weeks ahead according to report. Sales of kraft paper have held up better than expected in view of the British and French tariffs and have approximated the normal capacity.

Business in news print, however, says the report, is marking time and the outlook for this year is still uncertain. Although a British duty on paper has been anticipated for some time, complaint is made in Sweden that the rate of 50 per cent on wrapping, including parchment and greaseproof papers, is almost prohibitive. At the same time it is pointed out that the British mills are not equipped to supply the 185,000 tons formerly imported of which about 90,000 tons were supplied by Swedish mills.

To Investigate Cost of Casein

The United States Tariff Commission has approved plans for work in Argentina in connection with the cost of production of casein. This investigation was ordered in compliance with a resolution passed by the Senate. Walter Fischer, Philip W. Gates and Laurence G. Newman were assigned to this work and they sailed from New York February 6.

The Commission has announced that applications recently received from the Monite Waterproof Glue Company, of Minneapolis and the Centro de la Industria Lechera, of Buenos Aires, requesting decreases in the rate of duty on casein, have been merged with the pending investigation on that subject.

George W. More Passes On

George W. More, dean of the New York paper stock trade, for more than half a century prominently identified with the paper makers' supplies industry and for the past 35 years manager of the mill supply department of George W. Millar & Co., Inc., 284 Lafayette street, New York, died Sunday night, February 7, at his home, 240 South Maple avenue, Ridgewood, N. J., in his eighty-second year. Mr. More had attended to his business duties as usual up to a few days ago when he caught cold which developed into pneumonia.

"Major" More, as he was fondly called by his close friends in the trade, came to New York originally from Springfield, Mass., more than fifty years ago and began his career in the paper mill supplies trade with the old Charles Harley Company. Afterwards he was with John T. Lyon & Co. in the same line, and in January, 1897, he went with George W. Millar & Co., Inc., to assume the management of the mill supply department of that concern, succeeding E. W. Taylor, deceased.

Probably no individual in the paper stock business was better known or more universally liked and respected than Mr. More. He had traveled extensively among the paper mills of the country and was widely known by mill men. His kindly ways and genial personality won him many friends among consumers, dealers and packers, all of whom greatly respected him for his strict business principles.

Mr. More was a widower, his wife having died some years ago. He is survived by a son and two daughters.

New High Speed Towel Folder

A new high speed rotary towel folder has just been introduced by the Hudson-Sharp Machine Company, pioneer manufacturers of paper converting machinery at Green Bay, Wisconsin.

The new piece of equipment, which is ball bearing throughout, has been engineered with speed and accuracy as its outstanding features. All parts are designed and balanced to eliminate vibration and to provide extreme speed with practically no noise.

The new machine will produce from 30 to 40 cases of standard interfolded towels per hour or an output of from 240 to 320 cases in an eight hour day.

These new type machines have been given comprehensive tests in some of the leading mills and have proved to be all that has been claimed of them. The Hudson-Sharp Company now has additional units in the process of manufacture.

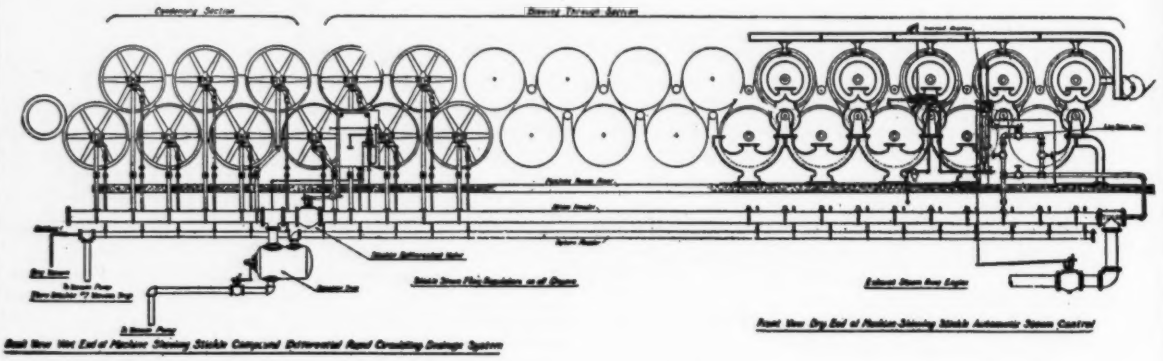
Great Atlantic Paper Co. Expands

Anticipating greatly improved business conditions during 1932, the Great Atlantic Paper Company, Inc., 77 Wooster street, New York City, headed by Jack Galewitz, has secured the exclusive agency for the sale and distribution of White and Colored Manifold Papers, manufactured by the Ron-Noc-O Paper Corporation, formerly the Warren Parchment Company, Dexter, N. Y.

The Great Atlantic Paper Company, Inc., has also acquired 100,000 square feet additional warehouse space, with a railroad siding, where it will carry 1,000 tons of standard news print paper in Jumbo rolls, in regular standard sizes for the publishers. It has now 50 carloads enroute from the mill.

The company has also installed several envelope machines for the manufacture of Open End Envelopes and have a capacity of 300,000 envelopes per day.

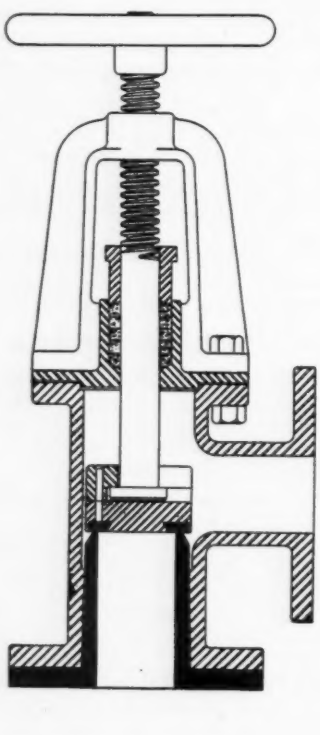
STICKLE'S SYSTEM OF DRYING PAPER



The Stickle Automatic Steam Control and Differential Rapid Circulating Drainage System will automatically maintain an evenly dried sheet at the lowest possible pressure at which a sheet of paper can be dried. The sheet will be held close to a one-half of one per cent moisture change.

Ask for Bulletin No. 18

STICKLE STEAM SPECIALTIES CO.
NEW YORK INDIANAPOLIS, IND.



This Particular Type of

Hardy Angle Valve

Made only in Chrome-Nickel Steel

is specially designed for service in

Acid and Steam Lines

THE seat is a free taper fit into the body and cannot work loose. It is easily removed for redressing. A gasket between flanges prevents leaking. There are no parts to cross thread and stick. Plain disc without lead most satisfactory.

Wm. A. Hardy & Sons Co. Fitchburg, Mass.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Erving, Mass.—Erving Paper Mills have had tentative sketches prepared for a new addition to their plant. Estimates of cost will be made in near future, or when company authorizes work to proceed. Raymond E. Palmer, 58 Suffolk street, Holyoke, Mass., is engineer.

Boston, Mass.—Haigh Paper Box Company, recently organized with capital of $10,000, is said to be planning early operation of local plant for manufacture of paper boxes and containers. Stanley Haigh, 44 Slade road, Belmont, Mass., is president and treasurer.

Chester, W. Va.—The E. C. Otis Manufacturing Company, Toronto, Ohio, manufacturer of building papers, paper roofing and kindred products, has approved plans for a new plant at Chester, consisting of a one-story unit, 50 x 184 feet. It will give employment to about 60 persons and is estimated to cost about $65,000, with equipment. A list of machinery to be installed will be arranged at once. The new plant is scheduled to be ready for service early in the summer. E. C. Otis heads the company.

Indianapolis, Ind.—The National Paper Stock Company, Michigan street and Canal, is considering rebuilding of portion of three-story storage and distributing plant, recently destroyed by fire, with loss reported over $75,000, including equipment and stock.

San Francisco, Cal.—The Paterson-Pacific Parchment Company, 68 Rincon street, has work under way on a new storage and distributing plant unit at Bryant and Rincon streets, to be three-story, reported to cost close to $35,000, with equipment. General contract recently was let to Cahill Brothers, 206 Sansome street, San Francisco. L. H. Nishkian, 525 Market street, is engineer in charge.

Jacksonville, Fla.—Southern Container Corporation, Brewton, Ala., P. F. Watson, secretary, is said to be concluding arrangements for the purchase of a tract of about 3 acres of land at Commodore Point, Jacksonville, for site for a new plant for the manufacture of corrugated boxes and containers. The initial unit will be one-story and will be equipped for a capacity of 15,000 boxes per day. It is reported to cost over $25,000, including equipment. Project is expected to be placed under way at an early date.

New York, N. Y.—The Frost Package Corporation, recently organized by Paul J. MacCutcheon, 1177 Bushwick avenue, Brooklyn, N. Y., and associates, is said to be planning operation of a local plant for the manufacture of paper boxes and containers for food products, including confectionery. The company is capitalized at 500 shares of stock, no par value. Henry J. Sage, 60 Gramercy Park, New York, is one of the incorporators of the new company.

Cedar Rapids, Iowa—The Hach Brothers Paper Company, Twelfth avenue and Second street, is planning early rebuilding of portion of storage and distributing plant, recently destroyed by fire, with loss reported at $60,000, including equipment and stock.

North Bergen, N. J.—Gibraltar Corrugated Paper Company, Inc., North Bergen, affiliated with the Container Corporation of America, Inc., 111 West Washington street, Chicago, Ill., has taken title to the plant of the last noted company at 1723 Bergen Turnpike, near Thirty-eighth street, North Bergen, consisting of a two-story factory, 250 x 378 feet. Purchasing company will occupy for local plant.

Dallas, Tex.—Priesmeyer & Co., 408 North Fourth street, St. Louis, Mo., manufacturer of paper novelties, etc., has leased space in building at 419 Browder street, Dallas, and will occupy for new factory branch, storage and distributing plant. It is proposed to occupy at once. R. J. Priesmeyer will be in charge of new branch.

East Rutherford, N. J.—The Flintkote Company, 100 East 42nd street, New York, manufacturer of paper roofing and allied products, has awarded general contract to the Ferber Construction Company, 16 Johnson avenue, Hackensack, N. J., for proposed new addition to plant at East Rutherford, consisting of a two-story structure, reported to cost close to $40,000, with equipment. Work will be placed under way at once. Karl A. Lefren, Inc., 171 Madison avenue, New York, is engineer. Company headquarters are in the Park Square Building, Boston, Mass.

New York, N. Y.—Fine Art Box Company, Inc., recently chartered with capital of $10,000, by Murray A. Bramson, 336 Fort Washington avenue, New York, and associates, is said to be planning operation of a local plant for the manufacture of paper boxes and containers. Philip Pellenberg, address noted, is one of the incorporators.

Philadelphia, Pa.—The Southwark Paper Box Company has been organized with a capital of $25,000, to take over and expand company of the same name, with local plant at 2412 South Sixth street, manufacturer of paper boxes, containers, etc. The new company is headed by Louis and Robert Nelson, and Isaac Avart.

Vineland, N. J.—The Sayford Paper Specialty Company, Vineland, manufacturer of paper bottle caps and kindred products, has arranged for a merger with the Frank M. Sayford Company, 50 Washington street, Brooklyn, N. Y., manufacturer and distributor of similar specialties. The new organization will operate under the name of the Frank M. Sayford Company. It is proposed to concentrate production in the future at the Vineland plant, and it is said that an expansion program will be carried out there in the future, to provide for increased output. The company will be affiliated with the Ridgewood Paper Company, 924 Cherry street, Philadelphia, Pa.

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THE YEAR IN PAPER

An excellent analysis of the pulp and paper industry in North America for the past year is afforded, as usual, in the annual review section of this Convention Number of the PAPER TRADE JOURNAL. Various divisions of the industry have been concisely reviewed by representative leaders of the industry in their particular fields and the information derived therefrom may be depended upon as thoroughly accurate and trustworthy. The reviews are liberally illustrated with important statistical tables and numerous graphs reproduced through the courtesy of Emmett H. Naylor, secretary-treasurer of the Writing and Cover Paper Manufacturers Association; J. A. C. Kavanagh, director of the Statistical Department of the American Paper and Pulp Association; and Grafton Whiting, statistician of the Paperboard Industries Association.

Reports received by the Writing Paper Manufacturers Association from all paper-making machinery manufacturers indicated that ten new machines were installed during the past year in the United States, with a daily capacity of 595 tons. This represents the smallest number of machines and the smallest capacity added in any of the last twelve years. Capacity at the end of 1930 was estimated at 13,830,000 tons, and 1931 additions bring the capacity of the industry to 14,000,000 tons. The estimated production of 9,000,000 tons for 1931 indicates operations at 64 per cent of capacity, as compared with 73 per cent of capacity in 1930, and 82 per cent in 1929. Three additional machines for book paper, two kraft machines with a daily capacity of 250 tons and three tissue machines making 90 tons per day were installed. For 1932 four machines are now on order, having a daily capacity of 180 tons. One of these is a large book machine having a capacity of 150 tons per day.

Production of news print paper declined considerably during 1931. The total North American output of news print paper was 3,688,450 tons, of which 2,220,775 tons were made in Canada, 1,157,497 tons in the United States, 294,983 tons in Newfoundland and 15,195 tons in Mexico. The Canadian output was 11.3 per cent less than in 1930, that in the United States 9.7 per cent less, with a gain of 2.7 per cent in Newfoundland and 6.4 per cent in Mexico, making a total continental decrease of 399,614 tons, or 9.8 per cent. Stocks of news print paper at the end of the year at United States and Canadian mills totalled 86,923 tons, which was equivalent to 4.8 days average production. In Canada, the most important developments of the year have centered around the efforts of news print executives to stabilize the industry. Negotiations were opened up for a giant merger of Canadian news print companies which would bring into one organization companies having a total capacity of 200,000 tons annually. The negotiations are proceeding favorably and have arrived at a point where the various companies are tabulating statements. The principal efforts of the news print producers will naturally be directed towards the most economical operation of the combined properties.

The fine paper market had again the distinction of proving the most stable section of the paper industry during the past year, notwithstanding the fact that No. 1 sulphite bonds declined in price last June, while quotations on rag content papers declined 10 per cent in December. Far from indicating instability, however, these declines represent an orderly adjustment to meet market conditions. Production of the mills during 1931 averaged 67 per cent of normal capacity, as compared with 83 per cent in 1930. Shipments averaged 69 per cent, showing that mill stocks did not accumulate, but rather declined. Merchants' stocks also decreased considerably. The fine paper industry is now up-to-date in all kinds of manufacturing improvements, and with the physical equipment for making paper never finer, the mills are enabled to manufacture at lower costs.

General business conditions seriously affected the book paper industry during 1931. The depression, although considered severe in the early part of the year, gradually became worse, and perhaps reached the climax in December, when the book paper mills did not operate more than from about 55 to 60 per cent. While the decrease in the consumption of book paper extended to practically all lines, it was experienced more particularly in the publication of magazines and periodicals. Although circulations have been fairly well maintained, publishers have been forced to reduce the text pages, which, together with the loss of advertising, meant a very large decrease in the consumption of paper. This situation naturally affected book paper prices, the mills apparently making any price to secure business to enable them to increase their percentage of operation. Three new machines were installed during 1931, with a capacity of 155 tons, and as far as can be ascertained not more than one new machine will come on the market during 1932. The outlook for the current

year, therefore, will depend upon the recovery of business generally, especially advertising in periodicals and magazines.

While there was a fairly normal and constant demand for kraft paper during the past year, quotations fluctuated widely, keeping the market upset and causing heavy losses to the manufacturers and converters and to the merchants and distributors. The existing condition of excess capacity was further aggravated by the bringing in of new tonnage and the effort, which was general throughout the industry, to produce and sell more than the market could absorb, made normal marketing impossible. Fortunately, as the result of courageous leadership on the part of one manufacturer, ably supported by intelligent co-operation from the rest of the industry, and untiring efforts on the part of those intrusted with the carrying out of an industry-wide program for its profitable stabilization, the industry has pulled itself together. New prices have been announced which are more commensurate with average costs and fortitude and better knowledge of competitive co-operation should carry the industry through to better days.

Production of paper board during 1931 held close to that of 1930, contrary to the general trend. Failure to operate profitably during the year in spite of the sustained volume of output was due to the severe decline in quotations. Owing to plant expansion and the addition of new machines in recent years, the capacity of the box board mills was in excess of demand, with the result that a number of machines were forced into idleness. During the last half of 1927 box board prices began a decline which has continued irregularly to the present time. In the container division the anticipated volume of demand did not materialize during the first quarter, but was held back until June. Following this the remainder of the year conformed to exception. The volume of folding boxes changed little and the price decline was less than in the container division. Should conditions improve, the paper board industry will probably be one of the first to feel the betterment, as it always responds quickly to changes in general business.

From the reviews presented it will be clearly seen that paper suffered to some extent in the general business depression, although the majority of grades have not been as seriously affected as most other basic industries. It is pleasing to note that efforts are being made to increase operating efficiencies and to introduce all possible economies. The outlook for the future is considered fairly promising and some seasonal improvement in the demand for paper is already apparent. One of the most pleasing factors in the situation is the firmer trend of kraft wrapping paper which is encouraging manufacturers in other branches of the industry to maintain quotations on a steadier basis. In conclusion, it is obvious that profits will be more satisfactory during 1932 if the manufacturers continue to show the spirit of co-operation which now prevails and profit from their mistakes of the past few years.

News Print Production for January

Production of news print in Canada during January 1932 amounted to 171,321 tons and shipments to 171,843 tons according to the News Print Service Bureau. Production in the United States was 94,247 tons and shipments 94,550 tons, making a total United States and Canadian news print production of 265,568 tons and shipments of 266,393 tons. During January, 23,991 tons of news print were made in Newfoundland and 1,255 tons in Mexico, so that the total North American production for the month amounted to 290,814 tons.

The Canadian mills produced 11,752 tons less in January, 1932 than in January, 1931, which was a decrease of 6 per cent. The output in the United States was 6,947 tons or 7 per cent less than in January 1931, in Newfoundland 1,595 tons or 6 per cent less, and in Mexico 168 tons more, making a total decrease of 20,126 tons or 6 per cent from January, 1931.

Stocks of news print paper at Canadian mills totalled 53,683 tons at the end of January and at United Sattes mills 32,406 tons, making a combined total of 86,089 tons compared with 86,913 tons on December, 31.

Machinery for Experimental Pulp Mill

Machinery for the State Forestry Department's pulp mill has reached Savannah and will be set up in the near future, it was announced by B. M. Lufburrow, state forester. Dr. Charles Herty, noted Georgia chemist, has gathered a group of trained men to conduct the experiments, and will make his first tests in the manufacture of news print paper, it was said.

Special attention at the paper research station is to be given pines and then to developing and using the most common hardwoods. The laboratory staff has the cooperation of the Federal Laboratory at Madison, Wisconsin.

Paper manufacturers, the forester said, are showing the keenest interest in the outcome of the Georgia experiments, which, if successful, will open up a new field for the manufacturer and a new source of revenue to the south, especially Georgia, wherein the pine tree abounds.

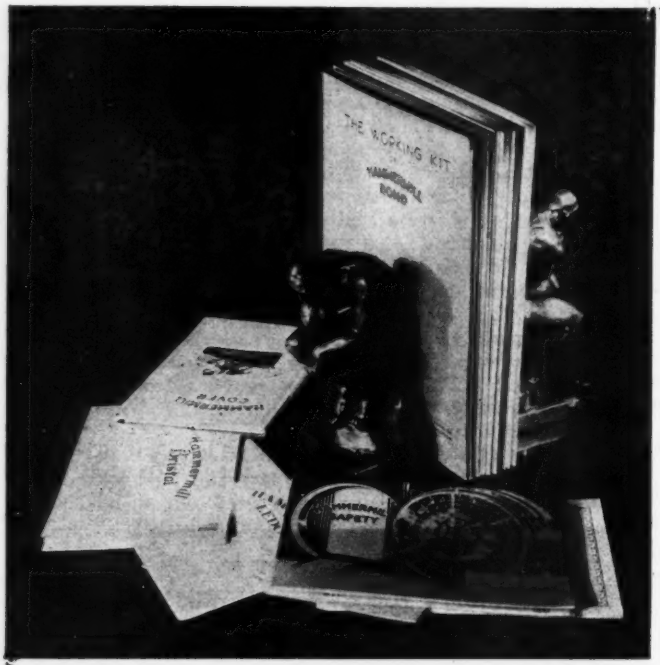
Funds for Dr. Herty's work are being supplied by the state and the Chemical Foundation of New York. The state has set aside $40,000 and the foundation $50,000.

Penn Card Co. Opens Washington Div.

The Penn Card and Paper Company, Inc., of 410 Race street, Philadelphia, announces the opening of a branch warehouse in Washington, D. C., at 808 H Street, N. W., which will be under the management of L. W. Sorrell, who is a thorough paper man, and well known among the trade for the last twenty-five years. A line of paper, card board and envelopes, practically everything required in the print shop will be carried at the new warehouse.

The Penn Card and Paper Company has been in the paper business in Philadelphia for almost thirty years, carrying in addition to its regular lines, a very large variety of jobs and overruns.

In addition to the stock which the company will carry in Washington, stock is carried in Philadelphia, ranging from 100 to 150 carloads, in its own five-story building, comprising one and one-half acres of floor space. This large stock is available to the trade, all deliveries being made from twenty-four to forty-eight hours by motor truck.



HAMMERMILL PAPER COMPANY
ERIE, PENNSYLVANIA

Any of these books will be sent to

(1) Any purchasing agent of a paper mill who is interested in using any of our products. Few mills make all the varieties of paper they use in the conduct of their business. If you are not a competitor you may be a customer.

(2) Any mill supply man. You know paper and paper making. You use paper in your business. We shall appreciate your consideration of our product.

Use this handy coupon.

HAMMERMILL PAPER COMPANY, ERIE, PA.
Please send me sample booklets as checked:

☐ Hammermill Bond
☐ Hammermill Bond Envelopes
☐ Hammermill Ledger
☐ Hammermill Bristol
☐ Hammermill Cover
☐ Hammermill Safety
☐ Hammermill Mimeograph
☐ Hammermill Writing
☐ Management Bond
☐ Hammermill Offset
☐ Hammermill Laid Antique
☐ Hammermill Posting
☐ Hammermill Post Card
☐ Hammermill Boxed Papers
☐ Folder of details about all Hammermill lines.

NAME _____

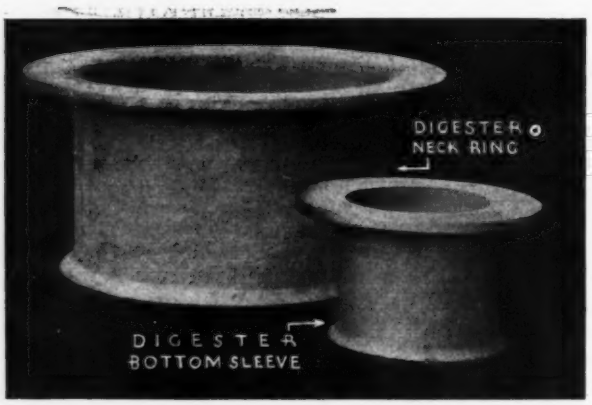
POSITION (OR DEPT.) _____

Fill in *both* lines; then attach coupon to your office letterhead

MISCO "C"

The corrosion resistant alloy

is proof against corrosion by sulphite acids



This is demonstrated by the fact that *no MISCO "C" casting in sulphite mill service has ever been replaced.* MISCO "C" castings are sound and readily machinable. For these reasons it is safe to specify MISCO "C" when ordering:

Digester Neck Rings
Digester Bottom Sleeves
Blow-off Valves
Acid Valves
Digester Heads
Acid Pumps
Fittings
Bottom Crosses

and all other equipment exposed to corrosion by sulphite acids.

Write for Bulletin No. 5

MICHIGAN STEEL CASTING COMPANY
1990 GUOIN ST. . . DETROIT, MICH.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

SUMMARY

WEEK ENDING FEBRUARY 13, 1932

Cigarette paper	1013 cs.
Wall paper	21 bls., 8 cs.
Paper hangings	3 bls., 3 cs.
News print	1379 rolls
Printing paper	29 cs.
Wrapping paper	65 rolls, 23 bls., 15 cs.
Colored paper	17 cs.
Decalcomania paper	19 cs.
Transfer paper	23 cs.
Filter paper	26 bls., 50 cs.
Filter masse	75 bls.
Surface coated paper	59 cs.
Metal coated paper	32 cs.
Photo paper	1 cs.
Parchment paper	6 cs.
Coated tissue	5 cs.
Cover paper	3 cs.
Tissue paper	3 cs.
Writing paper	15 cs.
Envelopes	8 cs.
Gummed paper	8 cs.
Paper board	3 cs.
Card board boxes	4 cs.
Card board	4 cs.
Miscellaneous paper	377 rolls, 250 bls., 125 cs.

CIGARETTE PAPER

Max Speigel & Sons, Amer. Importer, Hamburg, 5 cs.
Max Speigel & Sons, Pr. Harding, Hamburg, 5 cs.
Champagne Paper Corp., McKeesport, Havre, 248 cs.
Champagne Paper Corp., Paris, Havre, 63 cs.
American Tobacco Co., Paris, Havre, 550 cs.
——, Paris, Havre, 14 cs.
Liggett & Myers Tobacco Co., Paris, Havre, 22 cs.
Standard Products Corp., Paris, Havre, 72 cs.
Brown & Williamson Tobacco Co., Berengaria, Southampton, 34 cs.

WALL PAPER

F. A. Binder, Europa, Bremen, 4 bls.
Guaranty Trust Co., New York, Hamburg, 5 cs.
F. A. Binder, New York, Hamburg, 3 bls.
F. J. Emmerich, New York, Hamburg, 2 bls., 3 cs.
Kensington Wallpaper Co., New York, Hamburg, 10 bls.
Globe Shipping Co., Pr. Harding, Hamburg, 2 bls.

PAPER HANGINGS

W. H. S. Lloyd & Co., Alaunia, London, 3 cs., 2 bls.
F. J. Emmerich, Alaunia, London, 1 bl.

NEWS PRINT

Com'l Bank & Trust Co., Francisco, Hull, 384 rolls.
——, Topdalsfjord, Oslo, 123 rolls.
Brooklyn Times, Parrakoola, Norrsundet, 145 rolls.
Gilman Paper Co., Parrokoola, Norrsundet, 299 rolls.
Perkins Goodwin & Co., Pr. Harding, Hamburg, 414 rolls.
H. Reeve Angel & Co., Inc., Blankaholm, Kotka, 254 rolls.

PRINTING PAPER

International F'd'g Co., Jean Jadot, Antwerp, 8 cs.
P. Puttmann, Pennland, Antwerp, 21 cs.

WRAPPING PAPER

M. M. Cohen, Topdalsfjord, Oslo, 23 bls., 65 rolls.
Japan Paper Co., Pennland, Antwerp, 5 cs.
Sylvania Industrial Corp., Pennland, Antwerp, 10 cs.

COLORED PAPER

Borden Riley Paper Co., Pennland, Antwerp, 14 cs.
J. Beckhard, Europa, Bremen, 1 cs.
Phoenix Shipping Co., Europa, Bremen, 2 cs.

DECALCOMANIA PAPER

C. W. Sellers, Europa, Bremen, 17 cs.
B. F. Drakenfeld & Co., Adriatic, Liverpool, 2 cs. (duplex).

TRANSFER PAPER

Atlantic F'd'g Co., New York, Hamburg, 23 cs.

FILTER PAPER

H. Reeve Angel & Co. Inc., Berengaria, Southampton, 27 cs., 26 bls.
E. Fougera & Co., Berengaria, Southampton, 11 cs.
H. Reeve Angel & Co. Inc., Amer. Trader, London, 12 cs.

FILTER MASSE

Mager Bros. Co. Inc., Pr. Harding, Hamburg, 75 bls.

SURFACE COATED PAPER

Gevaert Co. of America, Jean Jadot, Antwerp, 35 cs.
Gevaert Co. of America, Pennland, Antwerp, 23 cs.
Phoenix Shipping Co., Pr. Harding, Hamburg, 1 cs.

METAL COATED PAPER

J. J. Shore & Co., New York, Hamburg, 26 cs.
Taub Hummell & Schnall, New York, Hamburg, 6 cs.

PHOTO PAPER

Davies Turner & Co., New York, Hamburg, 1 cs.

PARCHMENT PAPER

F. C. Strype, Jean Jadot, Antwerp, 5 cs.
National Freight F'd'g Co., New York, Hamburg, 1 cs.

COATED TISSUE

W. J. Byrnes, Berengaria, Southampton, 5 cs.

COVER PAPER

International F'd'g Co., New York, Hamburg, 3 cs.

TISSUE PAPER

American Express Co., New York, Hamburg, 2 cs.
Schenker & Co., Pr. Harding, Hamburg, 1 cs.

WRITING PAPER

Richard Shipping Co., Pipestone County, Havre, 10 cs.
Japan Paper Co., Paris, Havre, 5 cs.

ENVELOPES

J. B. Mast & Co., Sac City, Antwerp, 8 cs.

GUMMED PAPER

Heemsoth Basse & Co., Europa, Bremen, 8 cs.

PAPER BOARD

Colmar Paper Corp., Pennland, Antwerp, 3 cs.

CARD BOARD BOXES

Gevaert Co. of America, Pennland, Antwerp, 4 cs.

CARD BOARD

American Express Co., New York, Hamburg, 4 cs.

MISCELLANEOUS PAPER

J. J. Shore & Co., Europa, Bremen, 4 cs.
H. Reeve Angel & Co. Inc., Parrakoola, Norrsundet, 19 bls.
Lunham & Reeve, Parrakoola, Norrsundet, 98 bls., 341 rolls.
The Borregaard Co. Inc., Parrakoola, Gothenburg, 133 bls., 186 rolls, 86 cs.
Piccioto Co., Paris, Havre, 3 cs.
C. Steiner, Paris, Havre, 3 cs.
Marine Midland Trust Co., New York, Hamburg, 20 rolls.
W. Bersch, New York, Hamburg, 3 cs.
Keuffel & Esser, New York, Hamburg, 2 cs.
E. B. Baehr & Sons, New York, Hamburg, 5 cs.
Japan Paper Co., Pr. Hoover, Kobe, 16 cs.
Iwai & Co., Pr. Hoover, Kobe, 3 cs.

RAGS, BAGGINGS, ETC.

Irving Trust Co., Pipestone County, Havre, 101 bls. new cuttings.
Darmstadt Scott & Courtney, Pipestone County, Havre, 38 bls. bagging.
V. Galaup, Francisco, Antwerp, 48 bls. rags.
Seidel Herzog & Co. Inc., Francisco, Antwerp, 8 bls. bagging.
Castle & Overton, Inc., Francisco, Antwerp, 29 bls. rags.
——, Francisco, Antwerp, 59 bls. rags.
Continental Bank & Trust Co., Francisco, Antwerp, 62 bls. rags; 128 bls. bagging.
Amtorg Trading Corp., Francisco, Hull, 8 bls. paper stock.
Bank of N. Y. & Trust Co., Cold Harbor, Londonderry, 76 bls. rags.
Hicks Costarino & Co., McKeesport, Havre, 40 bls. rags.
E. J. Keller Co. Inc., McKeesport, ——, 43 bls. rags.
C. Nelson, Cameronia, Glasgow, 57 bls. rags.
T. D. Downing & Co., Cameronia, Glasgow, 51 bls bagging.
——, Cameronia, Glasgow, 122 bls. paper stock.
J. Cohen & Son, Adriatic, Liverpool, 36 bls. rags.
E. J. Keller Co. Inc., Sac City, ——, 40 bls. bagging.
Bank of N. Y. & Trust Co., Amer. Trader, London, 53 bls. rags.
Bank of N. Y. & Trust Co., Pr. Harding, Hamburg, 55 bls. rags.
E. Butterworth & Co. Inc., Savoia, Naples, 65 bls. rags.
Banco Coml Italiana Trust Co., New York, Hamburg, 49 bls. rags.

GLUE STOCK

—, New York, Hamburg, 278 bags,
——, Jean Jadot, Antwerp, 103 bls.

OLD ROPE

G. W. Millar & Co., Francisco, Hull, 169 coils.
International Purchasing Co., Excalibur, Genoa, 174 coils.
——, Pr. Harding, Hamburg, 113 coils.

WOOD PULP

E. J. Keller Co. Inc., Amer. Importer, ——, 878 bls. wood pulp, 135 tons.
Parsons & Whittemore, Inc., Topdalsfjord, Oslo, 250 bls. wood pulp.
J. Andersen & Co., Topdalsfjord, Oslo, 2375 bls. sulphite.
J. Andersen & Co., Topdalsfjord, Sarpsboro, 150 bls. sulphite.
Bulkley Dunton & Co., Flora, ——, 4250 bls. wood pulp.
Lagerloef Trading Co., Hallaren, Tolkis, 405 bls. sulphite.
Lagerloef Trading Co., Hallaren, Rauma, 2982 bls. sulphite.
Castle & Overton Inc., Hallaren, Kotka, 2227 bls. sulphite.
The Borregaard Co. Inc., Fred. VIII, Oslo, 30 bls. wood pulp, 5 tons.
Perkins Goodwin & Co., Fred. VIII, Oslo, 500 bls. sulphite, 101 tons.
E. M. Sergeant & Co., Fred. VIII, Oslo, 125 bls. sulphite, 25 tons.
Bulkley Dunton & Co., Parrakoola, ——, 2500 bls. wood pulp.
Johaneson Wales & Sparre, Inc., Parrakoola, Gothenburg, 750 bls. sulphate; 1200 bls. wood pulp.
J. Andersen & Co., Parrakoola, Gothenburg, 125 bls. sulphite.
Perkins Goodwin & Co., Parrakoola, Gothenburg, 1424 bls. chemical pulp.
Gottesman & Co., Inc., Parrakoola, Gothenburg, 500 bls. sulphite.
Castle & Overton Inc., New York, Hamburg, 420 bls. wood pulp, 84 tons.
Bulkley Dunton & Co., Pilot, ——, 2875 bls. wood pulp, 575 tons.

(Continued on page 159)

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Imports of Paper and Paper Stock

(Continued from page 157)

Johaneson Wales & Sparre Inc., Pilot, Sundsvall, 3450 bls. sulphite, 584 tons.
Lagerloef Trading Co., Blankaholm, Helsingfors, 1217 bls. sulphite.

WOOD FLOUR

B. L. Soberski, Topdalsfjord, Frederickstad, 1500 bags.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 13, 1932

H. J. Baker & Bro., Exhibitor, Genoa, 227 bls. glue stock.
Gilman Paper Co., Parrakoola, Norrsundet, 819 rolls news print.
J. W. Hampton Jr. & Co., Parrakoola, Norrsundet, 4 bls. paper.
The Borregaard Co. Inc., Parråkoola, Norrsundet, 170 rolls, 47 bls. paper.
E. J. Keller Co. Inc., West Harcuvar, ——, 95 bls. rags.

NEWPORT NEWS IMPORTS

WEEK ENDING FEBRUARY 13, 1932

Old Dominion Paper Co., Blankaholm, Kotka, 51 rolls, 102 bls. news print.
Virginia Paper Co. Inc., Blankaholm, Kotka, 56 rolls news print.
W. Stone & Co., Blankaholm, Kotka, 84 rolls news print.
Castle & Overton, Inc., Blankaholm, Kotka, 397 bls. sulphite.
Lagerloef Trading Co., Blankaholm, Kotka, 3368 bls. sulphate; 1338 bls. sulphite.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 13, 1932

Congoleum Nairn Co., McKeesport, Havre, 286 bls. rags.
Congoleum Nairn Co., McKeesport, Dunkirk, 49 bls. rags.
E. Butterworth & Co. Inc., Sac City, Antwerp, 69 bls. bagging.
Gottesman & Co. Inc., Blankaholm, Helsingfors, 600 bls. wood pulp.
Lagerloef Trading Co., Blankaholm, Kotka, 4368 bls. wood pulp; 6500 bls. sulphite; 5920 bls. sulphate; 46 rolls wood pulp boards.
Bulkley Dunton & Co., West Eldara, ——, 335 bls. wood pulp.
Gottesman & Co. Inc., Escherheim, Sweden, 6625 bls. wood pulp.
Gottesman & Co. Inc., Scheldelijn, Sweden, 6933 bls. wood pulp.
Gottesman & Co. Inc., West Eldara, Germany, 550 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 13, 1932

E. Butterworth & Co. Inc., Coelleda, Liverpool, 21 bls. waste paper.
Rice & Co., Coelleda, Liverpool, 38 bls. rags.
Bulkley Dunton & Co., Pilot, ——, 18500 bls. wood pulp, 3722 tons.
Johaneson Wales & Sparre Inc., Pilot, Sundsvall, 6175 bls. sulphite, 1140 tons.
Perkins Goodwin & Co., Pilot, Sundsvall, 1500 bls. sulphite, 304 tons.
——, Pilot, Hernosand, 3000 bls. sulphite, 500 tons.
Bulkley Dunton & Co., Elsa Menzell, ——, 2625 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING FEBRUARY 13, 1932

Darmstadt Scott & Courtney, McKeesport, Havre, 124 bls. bagging.
Chase National Bank, Coelleda, Liverpool, 138 bls. bagging.

PORTLAND IMPORTS

WEEK ENDING FEBRUARY 13, 1932

Gottesman & Co. Inc., Hallaren, Stockholm, 3000 bls. sulphite.
Lagerloef Trading Co., Hallaren, Tolkis, 3133 bls. sulphite.
Lagerloef Trading Co., Hallaren, Rauma, 5687 bls. sulphite; 3435 bls. mechanical pulp.
Lagerloef Trading Co., Hallaren, Hango, 706 bls. sulphite; 1483 bls. mechanical pulp.
Gottesman & Co. Inc., Parrakoola, Sweden, 3150 bls. wood pulp.
Gottesman & Co. Inc., Consul Olsson, Sweden, 10562 bls. wood pulp.
Gottesman & Co. Inc., Escherhrim, Sweden, 10405 bls. wood pulp.
Gottesman & Co. Inc., Gonzenheim, Sweden, 7950 bls. wood pulp.
Bulkley Dunton & Co., Toledo, ——, 250 bls. wood pulp.
Bulkley Dunton & Co., Elsa Menzell, ——, 2625 bls. wood pulp.

Lewis F. Lehr Dead

Lewis F. Lehr, president of the Malone Paper Company and residing at Malone, N. Y., died January 27, 1932. Mr. Lehr was one of the pioneer paper manufacturers of Northern New York. He was born on a farm in Jefferson County, State of New York, but early in his teens deserted the farm and went to Nebraska, learned telegraphy and entered the employ of the Chicago and Northwestern Railroad as a station agent. He later abandoned this line of endeavor, returned east and entered the mercantile business at Dexter, N. Y.

Mr. Lehr was ambitious and soon realized that a country mercantile business did not offer him the opportunities for advancement which he desired and accordingly after a short time in this business he entered the employ of the St. Lawrence Paper Company at Dexter, and under the tutelage of E. F. Bermingham, at that time widely known as a successful paper manufacturer, Mr. Lehr learned the fundamentals of this business.

In the year 1900 a group of men decided to purchase the old Weed paper mill at Malone, N. Y. This group consisted of James A. Outterson, Fred T. Ford, Mark S. Wilder, Edwin S. Clark, Brayton R. Clark, Herbert V. Clark and Frank B. Clark, and because of the ability displayed by Mr. Lehr as a manufacturer, he was induced to join the group.

The Malone Paper Company was organized and operated this mill until 1903, when it burned. At about this time substantially the same group of men had organized and built the DeGrasse Paper Company, of Pyrites, and Mr. Lehr was called to Pyrites to act as general manager of the new company. He remained there for approximately six years, during which time the Malone Paper Company rebuilt its plant at Malone and in 1909 Mr. Lehr returned to Malone and became vice-president and general manager of the Malone Paper Company. He continued to reside at Malone and manage this company from that time until his death. In 1930, following the death of Herbert V. Clark, Mr. Lehr became president as well as general manager of this company.

Mr. Lehr was married early in life to Emma Clark, of Dexter, N. Y., who, together with a brother William, of Elgin, Nebraska, a brother, Henry, of Albion, Nebraska, and a half sister, Mrs. Ora Donald, of Gouverneur, survive him. He was active in the affairs of the community in which he resided and was vice-president of the Peoples Trust Company of Malone. He served as Director in many business corporations and was a member of all the Masonic bodies, the Malone Lodge of Elks, and the Malone Rotary Club.

Funeral services were conducted for Mr. Lehr at Malone, N. Y., on January 30, 1932, and were largely attended, not only by his local friends, but by his many friends and acquaintances in the paper trade.

Wheelwright Mill Officials Sever Connections

Carl P. Lincoln, general manager, and John F. Carroll general superintendent, of the North Leominster mill of the George W. Wheelwright Paper Company, have severed their connections with the company. Until further notice, Mr. Carroll is making his headquarters with A. C. Holdsworth at 87 West 169th street.

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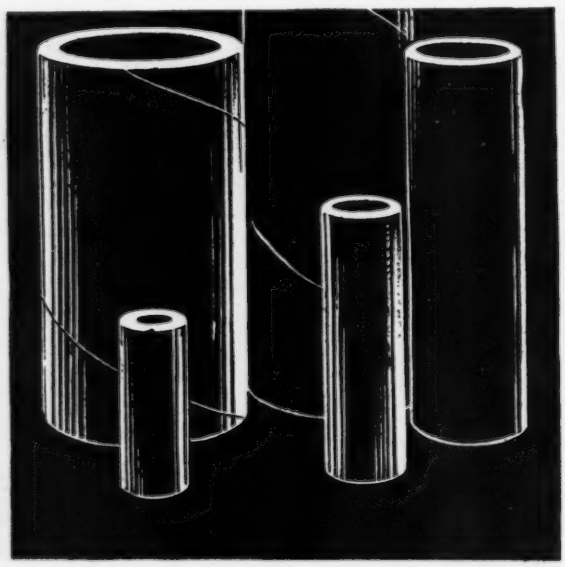

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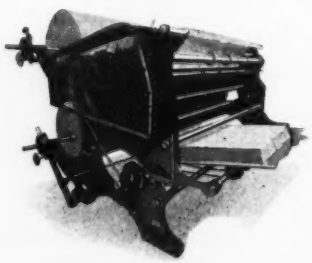

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New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, February 17, 1932.

Conditions in the local paper market are fairly satisfactory. Demand for the various standard grades of paper is moderately active. Sales forces of the leading paper organizations are conducting a strenuous campaign for orders and are more optimistic than of late. Prices are generally holding to previously quoted levels.

News print production is being maintained in sufficient volume to take care of current requirements. Shipments against contract are going forward to the publishers with regularity. The price situation continues unsatisfactory, due to some extent to competition from abroad, assisted by depreciated foreign currencies

Demand for the various grades of paper board is improving and production has been speeded up to meet requirements. The price situation is practically unchanged. The fine paper market is displaying a firmer trend. The coarse paper market is more stable, and kraft wrapping paper prices are well maintained.

Mechanical Pulp

While the ground wood market is rather quiet at present, the industry is in a sound statistical position, as offerings are not excessive, due to curtailed production both in North America and abroad. The contract movement is well up to average. Prices are holding to schedule, without difficulty.

Chemical Pulp

Trading in the chemical pulp market is fairly active. Demand for the various grades of both imported and domestic chemical pulp is fairly satisfactory, considering the general business depression. Contract shipments are moving in a seasonal manner. Prices are generally steady and unaltered.

Old Rope and Bagging

The old rope market is rather listless at present and demand from the paper mills for foreign and domestic old manila rope is listless. Small mixed rope is only moving slowly. The bagging market is irregular. Although roofing bagging is in moderate request, gunny and scrap continue dull. Quotations are nominal.

Rags

Paper mill interest in the domestic rag market is showing some signs of revival. The various grades of cotton rags are slightly more active. Roofing grades are in fairly persistent request for the time of year. Prices are generally steady and unchanged. No radical changes were reported in the imported rag market.

Waste Paper

The lower grades of paper stock are attracting some attention from the board mills. Demand for strictly folded news and mixed paper is slightly better. The price situation continues unsatisfactory, however. The higher grades are in steady request, especially book stock and ledger stock. Hard and soft white shavings and hard white envelope cuttings are holding up well.

Twine

Steadiness prevails in the local twine market, although most of the business transacted of late has been along routine lines. Inquiries for future account are fairly numerous, some of which should materialize into good orders. Prices are generally holding up to formerly quoted levels, although competition for extra desirable orders sometimes leads to concessions.

Bids and Awards for Government Paper

WASHINGTON, D. C., February 17, 1932—The Government Printing Office opened bids on Monday of this week for 3,000,000 pounds of news print paper, the annual supply for the Office for the fiscal year beginning March 1.

The bids were as follows: National Pulp and Paper Company, at 2.4676 cents per pound; Thomas J. McCormick Paper Company, 2.5485 cents; R. P. Andrews Paper Company, 2.3225 cents; Boston Paperboard Company, 2.375 cents; Perkins-Goodwin Company, 2.422 cents; Old Dominion Paper Company, 2.4968 cents; Reese & Reese, 2.66 cents; Great Northern Paper Company, 2.65 cents; and Lindemeyr Paper Company, 2.295 cents. The last named firm was low bidder. At the time this is written no award has been announced. The Mathers-Lamm Paper Company has been awarded the contract for furnishing the Government Printing Office with 2,000 sheets of 20 x 24 red glazed paper at $8.50 per M, bids for which were received on February 1.

The Link Paper Company will furnish 2,000 pounds of plate wiping paper in 24 inch rolls at 6.85 cents per pound, bids for which were received on January 27.

H. C. Davis Dead

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 15, 1932—H. C. Davis, president of the Davis Paper Company West Hopkinton N. H., manufacturers of leather board, counter board and chip board, and widely and favorably known in the trade, died February 6 at his residence, Contoocook, N. H. in his 82nd year. Mr. Davis underwent an operation for appendicitis last fall, and had been ill for a considerable period. In his early life he conducted an air-dried straw board mill at Davisville, N. H., which was later purchased by the United Paperboard Company. Later Mr. Davis built the mill at West Hopkinton. He was very popular and went on many hunting trips to New Brunswick. While he had not been very active in the industry of late, he retained his interest in it. A wife and two sons, Russel Davis and N. F. Davis, both of whom are of the company, are living. Among the representatives of the box board industry present at the funeral February 10 were Charles Fields, of Baird & Bartlett Company, and Paul F. Poinier and Frederick V. Carmer, of Poinier & Company, all of Boston.

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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, February 17, 1932.

BLANC FIXE.—No radical changes were reported in the blanc fixe market during the past week. Prices remain unchanged. The pulp is quoted at from $42.50 to $45 per ton; while the powder is selling at from 3¼ cents to 3⅜ cents per pound, in barrels, at works.

BLEACHING POWDER.—Steadiness prevails in the bleaching powder market. Demand is moderately active and the contract movement is about normal. Prices remain unaltered. Bleaching powder is quoted at from $1.75 to $2 per 100 pounds, in drums, at works.

CASEIN.—The casein market continues dull. Domestic standard ground is quoted at 7½ cents and finely ground at 8 cents per pound. Argentine standard is selling at 8½ cents and finally ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Some improvement was noticed in the demand for caustic soda. Prices remain unchanged. Solid caustic soda is quoted at from $2.50 to $2.55; while the flake and the ground are selling at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY.—The position of the china clay market is practically unchanged. Contract shipments are fairly heavy. Imported china clay is quoted at from $11 to $13 per ton; while domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE.—Most of the business transacted in the chlorine market was along routine lines. Shipments against contract are moving with regularity. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over at works.

ROSIN.—The rosin market is fairly steady for the time of year. Grades of gum rosin used in the paper mills are quoted at from $3.55 to $3.85 per 280 pounds, in barrels, at works. Wood rosin is still selling at $3.75 per 280 pounds, in barrels, on dock.

SALT CAKE.—Trading in the salt cake market was only moderately active. Salt cake is quoted at from $15 to $16; chrome salt cake at from $12 to $13 per ton, in bulk, at works. Imported salt cake is selling at from $14 to $15 per ton, ship side.

SODA ASH.—Demand for soda ash is fairly persistent at present. The contract movement is well up to average. Prices remain unchanged. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows; in bulk, $1; in bags, $1.25; and in barrels, $1.38.

STARCH.—The starch market is exhibiting a stronger undertone than of late. Contract shipments are proceeding at a steady pace. Prices remain unchanged. Special paper making starch is quoted at $2.54, in bags; and at $2.81, per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Conditions in the sulphate of alumina market are fairly satisfactory. Prices continue steady. Commercial grades are quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is rather quiet. Sulphur is quoted at $18 per long ton, on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Quietness reigns in the talc market. Prices are generally holding to previously quoted levels. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at mine; while imported talc is still selling at from $18 to $22 per ton, in bags, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	38.00
Bonds	5.00	@	53.25
Index	6.00	@	12.00
Writings—			
Extra Superfine	6.50	@	15.00
Superfine	6.25	@	14.75
Tub sized	4.50	@	7.00
Engine sized	3.00	@	5.00
Book, Cased—			
S. & S. C.	5.25	@	—
M. F.	3.75	@	5.00
Coated and Enamel	6.25	@	9.75
Lithograph	6.75	@	11.25
Tissues—Per Ream—			
White No. 1	.65	@	.70
Anti-Tarnish M. G. only	.65	@	.70
Colored	.70	@	.90
White No. 2	.50	@	.60
Kraft	.65	@	.70
Manila	.55	@	.60
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	3.37½	@	—
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.00	@	3.00
Card Middies	4.00	@	5.00
Glassine—			
Bleached, basis 25 lbs., No. 1	.09¾	@	—
No. 2	.11¾	@	—
Bleached, basis 20 lbs.	.11¾	@	—
(Delivered New York)			
News, per ton—			
Roll, contract	53.00	@	—
Rolls, spot	53.00	@	—
Sheets	58.00	@	—
Side Runs	38.00	@	42.00
Kraft—			
No. 1 Domestic	4.75	@	6.00
No. 2 Domestic	3.25	@	4.00
Southern	3.25	@	4.00
Imported	3.50	@	4.30
Boards—per ton—			
News	24.00	@	27.50
Straw	34.50	@	45.00
Chip	24.00	@	27.50
Binders' Boards	62.00	@	70.00
Standard 85 Test Liner	32.50	@	37.50
Sgl. Mla. Ll. Chip	32.50	@	37.50
(F. o. b. Mill)			
Wood Pulp Boards	70.00	@	80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—			
Moist	22.00	@	24.00
Dry	22.00	@	24.00
(F. o. b. Mill)			
No. 1 Domestic	20.00	@	28.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—			
Bleached	2.00	@	3.00
Easy Bleaching	1.60	@	1.75
No. 1 strong unbleached	1.50	@	1.75
Mitscherlich unbleached	1.55	@	1.75
No. 2 strong unbleached	1.40	@	1.50
No. 1 Kraft	1.50	@	1.75
No. 2 Kraft	1.40	@	1.50
Sulphate—			
Bleached	2.35	@	2.50
(F. o. b. Pulp Mill)			
Sulphite (Domestic)—			
Bleached	2.00	@	4.00
Easy Bleaching	1.75	@	1.90
News	1.50	@	1.65
Mitscherlich	2.40	@	2.55
Kraft (Domestic)	1.60	@	2.75
(Delivered Paper Mills)			
Soda Bleached	2.50	@	—

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.00
New White, No. 2	5.50	@	6.00
Silesias No. 1	5.25	@	5.50
New Unbleached	7.00	@	7.50
New Blue Prints	4.00	@	4.50
New Soft Blacks	3.50	@	4.00
Blue Overall	5.00	@	5.25
Fancy	3.00	@	3.50
Washables	2.75	@	3.00
Mixed Khaki Cuttings	3.50	@	4.00
Pink Corset Cuttings	5.00	@	5.50
O. D. Khaki Cuttings	4.50	@	4.75
Men's Corduroy	3.00	@	3.50
New Mixed Blacks	3.00	@	3.25

Old Rags

White, No. 1—			
Repacked	5.25	@	5.75
Miscellaneous	4.25	@	4.75
White, No. 2—			
Repacked	3.00	@	3.50
Miscellaneous	2.30	@	2.50
St. Soiled, White	1.50	@	1.75
Thirds and Blues—			
Repacked	2.25	@	2.50
Miscellaneous	1.65	@	1.85
Black Stockings	3.25	@	3.75
Roofing Rags—			
No. 1	.53	@	.58
No. 2	.48	@	.53
No. 3	.43	@	.48
No. 4	.38	@	.43
No. 5A	.33	@	.38

Foreign Rags

New Rags

New Dark Cuttings	1.40	@	1.50
New Mixed Cuttings	1.60	@	1.75
New Light Silesias	3.40	@	3.50
Light Flannelettes	3.75	@	4.00
Unbleached Cuttings	5.50	@	6.00
New White Cuttings	4.75	@	5.00
New Light Oxfords	4.00	@	4.25
New Light Prints	2.00	@	2.25

Old Rags

No. 1 White Linens	5.25	@	5.50
No. 2 White Linens	4.50	@	4.75
No. 3 White Linens	3.25	@	3.75
No. 4 White Linens	1.75	@	2.25
No. 1 White Cotton	4.00	@	4.25
No. 2 White Cotton	3.00	@	3.25
No. 3 White Cotton	2.25	@	2.50
No. 4 White Cotton	1.40	@	1.50
Extra Light Prints	1.90	@	2.10
Ord. Light Prints	1.60	@	1.75
Med. Light Prints	1.40	@	1.55
Dutch Blue Cottons	1.35	@	1.40
French Blue Linens	2.00	@	2.25
German Blue Linens	2.00	@	2.10
German Blue Cottons	1.20	@	1.25
Checks and Blues	1.25	@	1.30
Lindsay Garments	.75	@	.80
Dark Cottons	.70	@	.75
Old Shopperies	.55	@	.60
New Shopperies	.60	@	.65
French Blues	1.25	@	1.30

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.10	@	1.20
Domestic	1.15	@	1.25
Wool Tares, light	1.00	@	1.05
Wool Tares, heavy	1.00	@	1.10
Bright Bagging	1.00	@	1.05
Small Mixed Rope	.90	@	1.00
Manila Rope—			
Foreign	1.50	@	1.60
Domestic	1.50	@	1.75
New Burlap Cut	1.70	@	1.80
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
Hard, white, No. 1	2.55	@	2.75
Hard, white, No. 2	1.90	@	2.00
White envelope cuttings	2.05	@	2.15
Soft, white, No. 1	1.70	@	1.80
Flat Stock—			
Stitchless	.70	@	.80
Overissue Mag.	.70	@	.80
Solid Flat Book	.60	@	.70
Crumped No. 1	.45	@	.50
Solid Book Ledger	1.75	@	1.85
Ledger Stock	.60	@	.70
New B. B. Chips	.20	@	.30
Manilas—			
New Env. Cut	1.75	@	1.85
New Cuttings	1.40	@	1.50
Extra No. 1 old	1.05	@	1.15
Print	.45	@	.50
Bogus Wrapper	.45	@	.50
Container	.25	@	.30
Old Kraft Machine—			
Compressed bales	1.00	@	1.10
News—			
No. 1 White News	1.60	@	1.65
Strictly Overissue	.35	@	.45
Strictly Folded	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Common Paper	Nominal		

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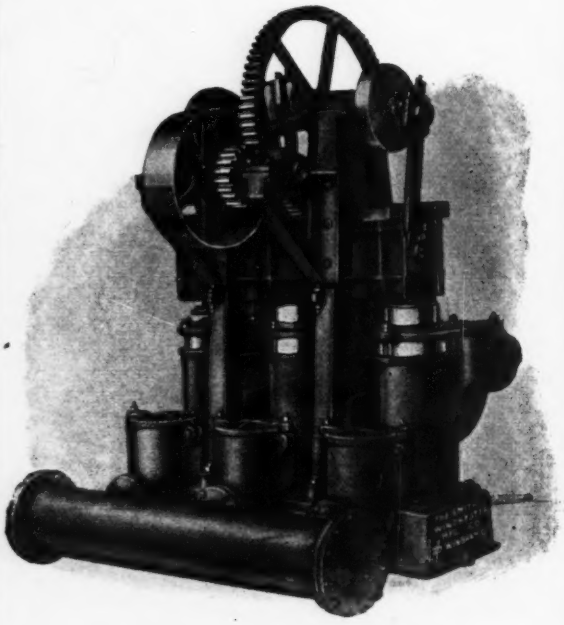
is on a par with all other Pulp and Paper Mill Equipment we manufacture. The fact of its satisfactory use in leading mills attests its efficiency.



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THE BEST PAPERS ARE MADE FROM RAGS
FOR DURABILITY
FOR IMPERISHABLENESS

ESLEECK MANUFACTURING CO.

TURNERS FALLS, MASS.

Twines
(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.15½	@	.16½
No. 2	.11¾	@	.12¾
Tube Rope—			
4-ply and larger	.09¾	@	.11¾
Fine Tube Rope—			
4-ply	.11	@	—
3-ply	.12	@	—
2-ply	.13	@	—
Paper Makers Twine			
Balls	.08¾	@	.10¾
Box Twine, 2-3 ply	.07	@	.08
Jute Rope	.09	@	.10
Amer. Hemp, 6	.27	@	.29
Java Sisal—			
No. 1 Basis	.10	@	—
No. 2 Basis	.09	@	—
New Zealand Sisal	.10	@	—
Sisal Lath Yarn—			
No. 1	.12	@	.14
No. 2	.10	@	.12
Manila Twine	.23	@	.28

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.30	@	.53¾
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.05	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.07	@	.18
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¼
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.50	@	5.00
Southern Kraft	3.25	@	—
No. 2 Kraft	3.25	@	—
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03½
Manila Tissue	.07	@	.07½
White Tissue	.07¼	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	53.00	@	—
Sheets	58.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	1.75	@	1.85
No. 1 Soft White	1.60	@	1.65
Ledger & Writings	.85	@	.90
Solid Books	.75	@	.80
Blanks	1.30	@	1.35
Krafts	1.15	@	1.25
New Kraft Cuts	1.30	@	1.45
Manila Env. Cuts	1.60	@	1.75
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.45	@	.50
Old Newspapers—			
No. 1	.40	@	.40
No. 2	.30	@	.40
Mixed Papers—			
No. 1	.30	@	—
No. 2	.25	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.04	@	.40
Ledgers	.06	@	.40
Writings—			
Superfine	.10	@	.18
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Fine No. 3	.05½	@	.18
Book, M. F.	.04¾	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.06	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.06	@	.09
Manila Sul., No. 1	.03	@	.05
Manila No. 2	.03	@	.04
No. 1 Kraft	.05¼	@	.06
No. 2 Kraft	.03¾	@	.04¼
Southern Kraft No. 1	—	@	.04
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04
(Delivered Philadelphia)			
News Print Rolls	58.00	@	62.00
Straw Board	50.00	@	—
News Board	30.00	@	32.00
Chip Board	25.00	@	27.50
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	73.00	@	75.00
No. 2, per ton	63.00	@	65.00
Carload lots	62.00	@	67.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.05½	@	.06
New White, No. 2.	.04	@	.04½
Light Silesias	.04	@	.04½
Silesias, No. 1	.04	@	.04½
Black Silesias, soft.	.04	@	—
New Unbleached	.05½	@	.06
Washable, No. 1	.02	@	.02½
Blue Overall	.04	@	.04½
Cottons—According to grades—			
Washable, No. 2	.01½	@	.02
New Blue	.01¾	@	.02
Fancy	.02	@	—
New Black Soft	.02	@	.03
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O.D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed.	.02½	@	.03

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.00	@	2.50
M. G.	3.50	@	4.00
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1	1.00	@	1.10
Repacked	.70	@	.80

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	—
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.10	@	2.20
No. 2 Hard White.	1.75	@	2.10
No. 1 Soft White.	1.50	@	1.70
No. 2 Soft White.	1.40	@	1.50
No. 1 Mixed	.45	@	.55
No. 2 Mixed	.40	@	.50
Solid Ledger Stock	1.20	@	1.30
Writing Paper	.60	@	.75
No. 1 Books, heavy	.60	@	—
No. 2 Books, light	Nominal		
No. 1 New Manila	1.25	@	1.50
No. 1 Old Manila	1.00	@	1.25
Print Manila	.45	@	—
Container Manila	.35	@	.40
Old Kraft	.90	@	1.00
Common Paper	.20	@	—
No. 1 Mixed Paper	.15	@	.25
Straw Board, Chip.	.25	@	.35
Binders Board, Chip.	.25	@	.35
Corrugated Board	.25	@	.35
Overissue News	.40	@	.50
Old Newspaper	.30	@	.35

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.05½	@	.11½
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¾
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	.03¼	@	.03½
(F. o. b. Boston)			
Southern Kraft	.03¼	@	.03½
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¾
(Delivered New England points)			
News Print, rolls	—	@	56.50
Straw Board, rolls	.009	@	52.50
Straw Board in Sheets, basis 35s to 70s	—	@	50.00
Filled News Board	27.50	@	30.00
Chip Board	—	@	25.00
Chip Board (Creasing)	27.50	@	30.00
Single Manila Lined Chip	—	@	35.00
Single White, Patent Coated News Board—			
Binder	52.50	@	60.00
Wood Pulp Board	70.00	@	75.00
Binder Boards	67.50	@	75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.50
No. 2 Hard White	2.25	@	2.50
No. 1 Soft White	1.50	@	1.75
No. 2 Mixed	.50	@	.55
No. 1 Mixed	.75	@	.85
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	—	@	.45
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	.80	@	.90
White Blank News	1.30	@	1.40
Kraft No. 1	—	@	.85
Manila	.90	@	1.00
No. 1 Mixed Paper	.15	@	.17½
Print Manila	.35	@	.40
Overissue News	.35	@	.40
Old Newspapers	.22½	@	.27½
Box Board, Chip	.17½	@	.20
Corrugated Boxes	.30	@	.32½
Screening Wrappers	.25	@	.32½

Bagging
(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.00
Domestic	.70	@	.80
Manila Rope—			
Foreign	1.50	@	1.65
Domestic	—	@	1.50
Transmission Rope	—	@	1.00
Mixed String	.25	@	.35
Jute Rope	—	@	.85
Jute Carpet Threads	.75	@	.90
Bleachery Burlap	—	@	2.25
Scrap Burlap	.75	@	.85
No. 1 Scrap Burlap	—	@	.90
Scrap Sisal	.90	@	1.10
Scrap Sisal for shredding	—	@	1.25
Wool Tares, heavy	1.00	@	—
New Burlap Cutting	1.50	@	1.75
Australian Pouches	—	@	1.50
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging	.75	@	.85
Bagging No. 2	—	@	.40
No. 1 Burlap	—	@	3.50

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1.	—	@	.05¼
New White No. 2.	—	@	.04
Silesias No. 1	.04½	@	.05
New Black Silesias	.02½	@	.02¾
New Unbleached	.05½	@	—
Fancy	—	@	.03¾
Washable	—	@	.03½
Cottons—According to grades—			
Blue Overalls	—	@	.05
New Black, soft	.04	@	.04¼
Khaki Cuttings	.03	@	.03½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	—	@	1.50
Thirds and Blues—			
Repacked	—	@	.85
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	.53	@	.58
No. 2	.48	@	.53
No. 3	.43	@	.48

Foreign Rags
(F. o. b. Boston)

Dark Cottons	.60	@	.70
New No. 1 White Shirt Cuttings	5.00	@	5.50
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.10	@	1.15
Old Linsey Garments	.65	@	.70

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.11¾	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (Carloads)	6.65	@	—
No. 3 M. F. (Carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.60	@	—
White Wrap	5.10	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.60	@	—
Fiber	5.60	@	—
Kraft, M. F.	5.98	@	—
Kraft No. 2	5.60	@	—
(Delivered Toronto)			
News, per ton—			
Rolls (contract)	56.50	@	57.00
Sheets	61.50	@	—

Pulp
(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	44.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.85	@	—
Soft White	2.40	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	—
Light and Crumpled Book Stock.	.80	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut	1.70	@	—
Printed Manilas	.65	@	—
Kraft	1.75	@	—
News and Scrap—			
Strictly Overissue	.50	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼

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ALUMINUM SULPHATE
(PAPER MAKERS' ALUM)

THE Standard Purity of this Company's product is maintained in an uncompromising degree, regardless of whether successive deliveries are from one or various of the Company's Works.

GENERAL CHEMICAL CO.
40 Rector Street, New York, N. Y.
Cable Address: Lycurgus, N. Y.
Sales Offices: Buffalo, Chicago, Cleveland, Denver, Los Angeles, Philadelphia, Pittsburgh, Providence, San Francisco, St. Louis.
In Canada: The Nichols Chemical Company, Ltd. Montreal, P. Q.

REG. U.S. PAT. OFF.

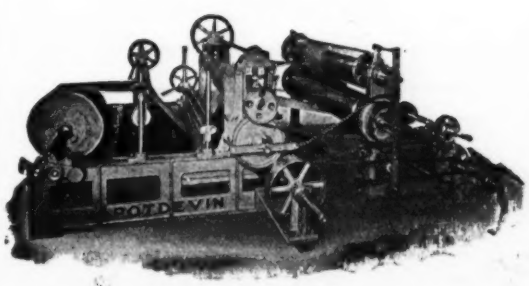
Also BAKER & ADAMSON C.P. ACIDS..REAGENTS *and* FINE CHEMICALS

POTDEVIN

PAPER WAXING MACHINERY

Three Widths—52" - 64" - 80"

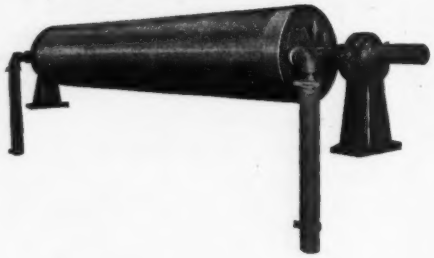
LIGHT OR HEAVY COATING
WET OR DRY WAX
ONE OR BOTH SIDES



POTDEVIN MACHINE CO.

1223 38th Street, Dept. 4, Brooklyn, N. Y., U. S. A.
Phones: Windsor 1700. 1701, 1702

The Farnham Improved Vacuum Roll



Use of the Farnham Improved Vacuum Roll eliminates flat boxes under felt and sheet and practically overcomes difficulties caused by a large amount of water in sheet entering press rolls. Prolongs life of felt and increases production.

Correspondence Invited. Write for Circulars and Full Description.

FARNHAM MANUFACTURING CO.

36 Indiana St., Buffalo, N. Y.

EXTENSION MODEL

Cambridge Surface Pyrometer

is an instrument which applied to the surface of a dryer or calender roll, instantly indicates the exact surface temperature. Its use enables the operator to locate water logged rolls and to maintain every roll at the correct temperature for efficient progressive drying.

The instrument is compact, rugged and easy to read. The extension rod permits temperature checking across the entire roll. Scale ranges are 50-250° and 50-400°F.

Send for List No. 194-P.T.

CAMBRIDGE INSTRUMENT CO., INC.

3512 GRAND CENTRAL TERMINAL, NEW YORK

Fourdrinier Wires, all widths up to 300 inches

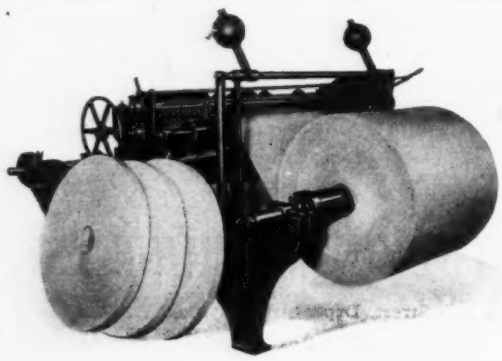
DIMOND WIRES

NEUMEYER & DIMOND

Established 1904

82-92 Beaver St. New York

Your Card in This Space Will Bring Results



HEAVY DUTY SLITTER and REWINDER

Designed to meet the requirements of all users of Automatic Machines that take the stock from the roll, and require a roll of large diameter wound true and solid.

With this slitter, wide and narrow widths cut at the same time are of uniform tension. A roll slit and rewound 1″ wide and 48″ diameter can be handled without danger of spinning. At very little additional cost per ton paper mills equipped with this Slitter can furnish their customers with paper or board slit and rewound from 1″ width and up. Made in three widths: 48″—60″—72″.

INMAN MANUFACTURING COMPANY

AMSTERDAM, N. Y.

Manufacturers of

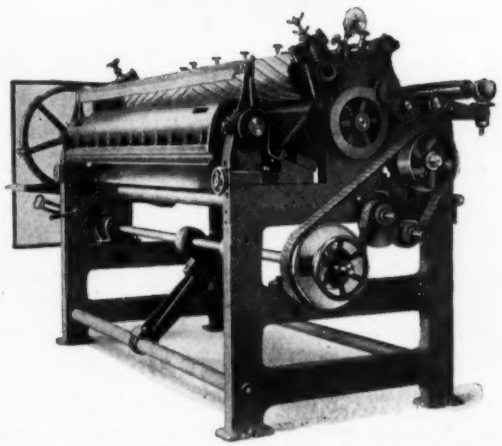
AUTOMATIC MACHINERY FOR PAPER BOXES AND ROTARY PAPER CUTTING MACHINERY

Cotton and Paper Rolls
Super Calenders
Friction Calenders
Embossing Calenders
Hydraulic Presses and Pumps

Successors to the Granger Foundry & Machine Co.

The Textile-Finishing Machinery Company
PROVIDENCE, R. I.

MODEL 28
ROLLER BEARING CUTTER



HAMBLET MACHINE CO.
LAWRENCE, MASS.
MAKERS OF
SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS, CUTTER KNIVES, PATENT TOP SLITTERS.

SHIPPING INSURANCE

The Use of

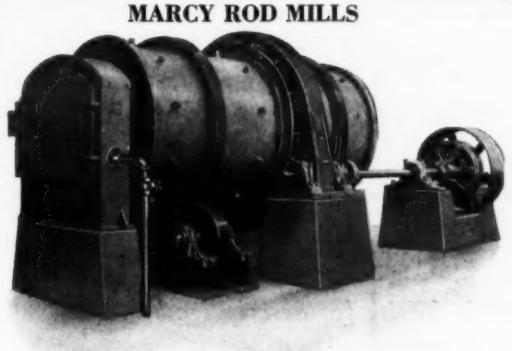
ELIXMAN CORES

protects your rolls and insures their delivery to your customer in perfect condition. They eliminate claims for damages.

SHIPPING INSURANCE

Your two sources of supply are
Canadian Elixman Company, HAMILTON, ONTARIO
Elixman Paper Core Company, CORINTH, N. Y.

MARCY ROD MILLS



Marcy Open End Rod Mills For Perfect Beating Of Every Type Of Stock.

1. Positively reduces power costs.
2. Absolute control under all conditions.
3. Maximum preservation of initial strength.
4. Preserves full fibre length.
5. Positive separation of fibre bundles.
6. Positively no unbeaten stock bypassed.

Send us a sample of your untreated pulp and we will send you proof.

PAPER MILL DIVISION
The MINE and SMELTER SUPPLY COMPANY
Denver, Colorado

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PULP AND PAPER MILL ENGINEERS
Grand Central Terminal Bldg. NEW YORK, N. Y.
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FINLAND PULPS — SULPHITE— 550,000 TONS
KRAFT— 150,000 TONS
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"THE FOURDRINIER THAT TOOK THE IRE OUT OF WIRE"
INTERNATIONAL WIRE WORKS
Menasha, Wisconsin

Appleton Wires
are good wires
APPLETON WIRE WORKS INC. APPLETON, WIS.

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TALC & AGALITE
FILLERS for PAPER
147 Nassau Street, New York

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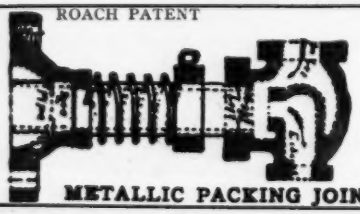
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ANDERSON, IND.
METALLIC PACKING JOINT FOR DRYERS

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21 EAST 40TH STREET, NEW YORK
PULP AND PAPER MILL ENGINEER

ANALYSES *and* TESTS *of*
PAPER, PULP AND PAPER-MAKING MATERIALS
FIBER ANALYSES SPECIFICATIONS
OFFICIAL PULP SAMPLING AND TESTING
Arthur D. Little, Inc.
Analytical Department
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PUMPS
For Every
Pulp and Paper Mill Purpose
Let Us Help Solve Your Problems
Lawrence Machine & Pump Company
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KRAFT-WELD
GUMMED SEALING TAPE
"GET THE BEST"
PAPER MANUFACTURERS CO. Inc.
PHILADELPHIA, PA.

TENSILASTIC
RUBBER ROLLS
Laboratory Controlled At Every Stage of Processing
AMERICAN WRINGER CO., INC., Woonsocket, R. I.

ROSS SYSTEMS
HEATING—VENTILATING—DRYING
J. O. ROSS ENGINEERING CORPORATION
201 North Wells Street CHICAGO
122 East 42nd St. NEW YORK
414 Lewis Bldg. PORTLAND, ORE.

Wisconsin Wire Works
FOURDRINIER WIRES
ROLLED WIRES, CYLINDER AND WASHER WIRES
APPLETON, WIS.

Permutit *Water Treating Equipment*
Write for descriptive bulletin
THE PERMUTIT CO., 440 Fourth Avenue, New York, N. Y.

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Consulting Engineer

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Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

Pulp and Paper Mills and other Industrial Plants.
Steam and Hydro-electric Power Plants
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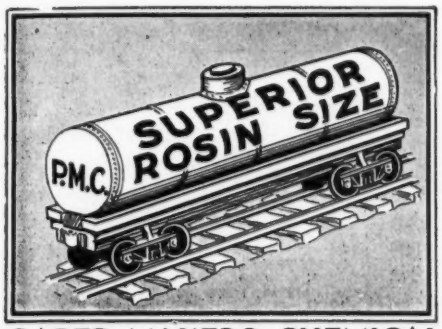

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Kalamazoo, Michigan

PERMANENT COLORS

Browns Greens Reds Yellows

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GREENS
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REDS
All types and shades of Oxides of Iron

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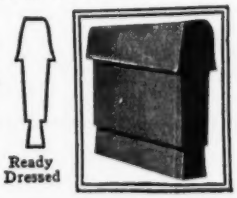
C. K. WILLIAMS & CO.
EASTON, PA.

"READY DRESSED" MILL COGS

LABOR SAVING—TIME SAVING

THE MOST ECONOMICAL FILLING THAT CAN BE PUT IN A MORTISE WHEEL



WE MAKE ANY STYLE OR SIZE WANTED

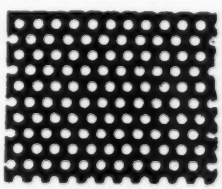
WRITE FOR INSTRUCTION SHEET "C" WHICH IS FREE

QUICK SERVICE ON ALL SIZES
THE N. P. BOWSHER CO., So. Bend, Ind.

Perforated Metal Screens

For Pulp and Paper Mills

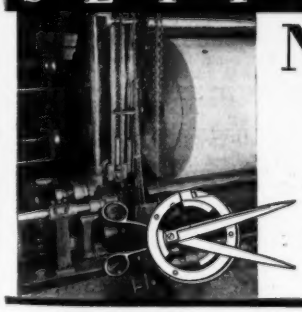
STEEL, COPPER, BRASS, BRONZE, MONEL METAL and other Alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.



".065" Round

CHARLES MUNDT & SONS
63-65 FAIRMONT AVE. JERSEY CITY, N. J.

LANGSTON SLITTERS



NOTED for producing firm, tightly wound rolls with straight, dust-free edges, Langston Slitters combine high-quality production with low operating costs.

Samuel M. Langston Co., Camden, N. J.

UNION SCREEN PLATE COMPANY
Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

UNION BRONZE

SCREEN PLATES FOR FLAT SCREENS

Old Plates Reclosed and Re-cut to Accurate Gauge.
Rolled Phosphor Bronze and Copper Plates for Rotary Screens

Sole Manufacturers of the
UNION-WITHAM SCREEN PLATE VAT AND FASTENER

The CLEARING HOUSE of THE PAPER TRADE

"SITUATIONS WANTED" ADVERTISEMENTS—4c a word, double rates for heavy face type. Minimum charge $1.00. If repeated ½ rate will be charged for each consecutive repetition.

"HELP WANTED" ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.

CLASSIFIED ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.

All classified "Help Wanted" and "Situation Wanted" advertisements are payable in advance.

HELP WANTED

IF YOU are open to overtures for new connections and qualified for a salary between $2,500 and $25,000, your response to this announcement is invited. The undersigned provides a thoroughly organized service, of recognized standing and reputation, through which preliminaries are negotiated confidentially for positions of the calibre indicated. The procedure is individualized to each client's personal requirements; your identity covered and present position protected. Established twenty-two years. Send only name and address for details. R. W. Bixby, Inc., 117 Downtown Building, Buffalo, New York.

FOR RESEARCH AND DEVELOPMENT WORK. Must have had good chemical training and mill experience, preferably with paper containing groundwood. Address Box 32-76, care Paper Trade Journal. F-18

WANTED—A man to operate and take charge of a combining machine. Must have experience in combining all kinds of boxboard and lining with glassine, bond paper and kraft. Please give experience, age and salary expected in first letter. Address Box 32-72, care Paper Trade Journal. F-18

MACHINE DESIGNER with broad, long-continued experience in connection with the manufacture and operation of paper finishing machines, such as coating, combining, saturating, embossing, etc. State age, experience, salary desired. All replies will be held strictly confidential. Address Box 32-77, care Paper Trade Journal. F-18

WANTED—Man to take full responsibility of drawing, etching, and electro plates, able to handle all details faithfully and carefully. Man from large paper, printing or waxing plant given preference. Give full details. Address Box 32-81, care Paper Trade Journal. Feb. 18

SUPERINTENDENT for converting department must be thoroughly experienced in toilet paper perforators and towel interfolders. Address Box 32-78, care Paper Trade Journal. F-18

CONFIDENTIAL EMPLOYMENT SERVICE WANTED—Beater engineer, beater room foreman and cylinder machine tenders. Charles P. Raymond Service, Paper Mill Dept., 294 Washington Street, Boston. F-18

WANTED—Young Chemical Engineer with experience in mill making sulphite specialties preferably as operator. Large mill located in New England offers excellent opportunity for one prepared to begin in minor capacity. Give full particulars. Address Box 32-82, care Paper Trade Journal. M-10

SITUATIONS WANTED

ELECTRICAL ENGINEER OPEN FOR POSITION. TECHNICAL GRADUATE. TWENTY YEARS EXPERIENCE. INSTALLATION, MAINTENANCE AND OPERATION OF PAPER MILL ELECTRIC EQUIPMENT. HYDRO-ELECTRIC PLANTS AND AUTOMATIC HYDRO-ELECTRIC PLANTS. ADDRESS BOX 32-60, CARE PAPER TRADE JOURNAL. F-25

TECHNICAL DIRECTOR long experienced in pulp and paper wishes change. Personal correspondence solicited. Address Box 32-48, care Paper Trade Journal. F-25

SITUATIONS WANTED

SALESMAN—Executive, age 36 with unusual qualifications, desires connection with mill or manufacturer. Experience covers 11 years as mill representative and 3 years with jobbers. Well versed in both fine and coarse papers. Address Box 32-53, care Paper Trade Journal. T.F.

CHEMIST—Twelve years experience covering all grades boxboard, sulphite, groundwood, tissues, specialties, cylinder and Fourdrinier machines. Research, control, operating, sales, development experience. Would consider position as Technical Director, Assistant Superintendent or Development Engineering. Now available. Address Box 32-51, care Paper Trade Journal. F-25

MACHINE TENDER—Twelve years experience on Test Liner and all grades of chip and news board. Married, sober and steady. Available at once. Address Box 32-84, care Paper Trade Journal. M-3

BOSS FINISHER and shipping clerk. Ten years experience on all grades of box board and paper, cutters and rewinders, good references. Address Box 32-85, care Paper Trade Journal. M-3

THOROUGHLY experienced fine paper salesman with an unusual background of ten years practical mill experience available for new connection in thirty days. Reliable, dependable, a producer with excellent references. Address Box 32-74, care Paper Trade Journal. F-25

EFFICIENT Board Mill Superintendent available. Years of experience manufacturing Box Board, Tag and Specialties, Construction and rebuilding old mills. References. Address Box 30-739, care Paper Trade Journal.

RESEARCH ENGINEER—Graduate mechanical engineer with heavy machinery shop and design background; drying, coating, calendering, new machines and processes, waste reduction; construction, maintenance. Address Box 32-73, care Paper Trade Journal. F-25

SUPERINTENDENT—Twenty-five years experience on various grades of paper; last fifteen years on greaseproof and glassine. Progressive. Best of references. Available immediately. Address Box 32-56, care Paper Trade Journal. F-18

SUPERINTENDENT—Wide range of practical experience in Paper, Pulp and Board Mills. Variety of grades. Address P. H. Moran, 624 State Street, Watertown, N. Y. F-18

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to advertisements appearing under Box Numbers in care of

PAPER TRADE JOURNAL
10 East 39th St.
New York, N. Y.

SITUATIONS WANTED

MECHANICAL ENGINEER, experienced machine layout, process design, groundwood, sulphite, sulphate pulp paper mills, pumping conveying, specifications, drafting, 13 years experience. Desire connection in consulting office. Address Box 32-67, care Paper Trade Journal. F-18

WAX PAPER SUPERINTENDENT would like to make a change. Have been in the business several years. Address Box 32-65, care Paper Trade Journal. F-18

AGGRESSIVE Paper Salesman with general executive experience and special aptitude for selling. Twenty years experience in the manufacturing and sale of coated and uncoated book papers, bonds, writings and specialties. Enduring connection desired with manufacturer where initiative and enthusiasm can find outlet. Address Box 32-64, care Paper Trade Journal. F-25

PLANT ENGINEER—Technical graduate with excellent training in plant engineering in three different paper mills, seeks position as plant engineer. Now completing two year assignment as Resident Engineer for well known New York consulting engineer. Address Box 32-80, care Paper Trade Journal. M-3

MISCELLANEOUS

CLARK MANUFACTURING COMPANY, Holyoke, Mass. Telephone 1828. Builders of cylinder moulds, couch and felt rolls, dandy rolls. We cover dandies and cylinders tight, for fast running machines. tf

WE are seeking absolutely serious inquiries from a paper machine or paper manufacturer relative to a process and apparatus for the extraction of fibrous matter from straw. Hans Unglaub, (Engineer) Junkerstrasse 1, Dessau, (Anh.) Germany. F-18

WANTED

WANTED—Two 1,000 lb. iron tube beaters. One 200 lb. beater. Address Box 32-62, care Paper Trade Journal. F-18

WANTED: Nine or twelve roll super calender for sixty inch paper. Address Box 32-83, care Paper Trade Journal. M-3

FOR SALE

PAPER COATING MACHINERY—Waxing Oiling, Gumming, Gluing, Asphalt Duplexing, Laboratory Coating and Treating machines. High Speed, new improvement. MAYER COATING MACHINES COMPANY, Inc., Rochester, N. Y. t.f.

FOR SALE—PAPER MACHINERY: Large stock of Beaters, Calenders, Super-Calenders, Rotary and Flat Bed Cutters, Digesters, Dryers, Flat Screens, Vibrating Screens, Grinders, Jordans, Hogs, Shredders, W. & P. Pulpers, Oliver Filters, Barkers, Lacquer Machines, Slitters and Rewinders, Fibre Board Presses, Kidder Presses, Copper Kettles, Wet Machines, Stuff Pumps, Dampeners, Coating Machines, Winders; Board and Paper, Fourdrinier, Bag Machinery and other items. Send for list. CONSOLIDATED PRODUCTS CO., 15-18 PARK ROW, NEW YORK CITY. t.f.

SITUATIONS WANTED

SALES ENGINEER available. Graduate mechanical engineer. Many years experience pulp and paper mill machinery and auxiliary equipment. Best of references. Address Box 32-88 care Paper Trade Journal. F-25

ASSISTANT SUPERINTENDENT or Technical Director in cylinder, fourdrinier or clay coating mill. Many years experience on all standard grades and specialties. Address Box 32-86, care Paper Trade Journal M-3

HELP WANTED

WANTED—Skilled help for high speed "tissue and light weight specialty paper machine." Address Box 32-87, care Paper Trade Journal. F-18

FOR SALE

FOR SALE
PAPER MILL MACHINERY

1—Fourdrinier Paper Machine. Takes wire 107" by 55 feet. Millspaugh Suction Couch. 3 presses. 17 dryers 48" x 105". 2 stacks of Calenders. Reel. Winder.

1—Pusey & Jones Fourdrinier Paper Machine. Wire 104" by 65 feet. Three sets presses. 30 dryers 48" x 102". Ten roll stack of Machine Calenders. English Reel.

1—Pusey & Jones Fourdrinier Paper Machine. Wire 84" by 65 feet. Three sets presses. 30 dryers 48" x 80". English Reel.

FRANK H. DAVIS COMPANY
175 Richdale Avenue Cambridge, Mass.

GOVERNMENT BIDS

TREASURY Department, Bureau of Engraving and Printing, Washington, D. C., February 4, 1932. Sealed proposals are invited to furnish paper boxes, paper box blanks, and paper, during the fiscal year beginning July 1, 1932. Samples must be received at the Bureau of Engraving and Printing not later than 2 P.M., Wednesday, March 16, 1932. Blank forms with specifications for proposals, giving dates on which the bids for the several schedules will be opened, and further information will be furnished on application to A. W. HALL, Director. F-18

TREASURY Department, Bureau of Engraving and Printing, Washington, D. C., February 10, 1932. Sealed proposals are invited to furnish dextrine, oils, textiles, and dry colors, during the fiscal year beginning July 1, 1932. The right is reserved to reject any or all bids or parts of bids. Samples must be received at the Bureau of Engraving and Printing not later than 2 P. M., March 24, 1932. Blank forms with specifications for proposals, giving dates on which the bids for the several schedules will be opened, and further information will be furnished on application to A. W. HALL, Director. F-25

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PAPER TRADE JOURNAL
10 East 39th St.,
New York, N. Y.

Classified Advertisement Brings Results

FOR SALE

FOR SALE

Twenty-eight tons Extra Quality Super News in 30" Rolls—Basis 24 x 38—45

Apply to

Arthur S. Zabriskie, Inc.

11 West 42nd St.

NEW YORK, N. Y.

HAVE MILL suitable for binders board—Opportunity for experienced man with some capital to start up. Good location for raw stock, labor and finished products. Address, Box 30-702, care Paper Trade Journal. t.f.

FOR SALE—2-Phase 220 and 2200 volt motors, size 1 to 200 H.P. Send for list to Morgan Paper Co., Div., Lititz, Pa. F-25

FOR SALE—One No. 2 Lannoye pulper, good condition, arranged for motor drive. Address box 32-61, care Paper Trade Journal. F-18

SLITTERS FOR SALE. Factory Rebuilt Cameron Slitters, various sizes. Opportunity to secure good slitter at attractive price. Address Box 32-70, care Paper Trade Journal. T.F.

EVERY WEEK—

The Paper Trade Journal publishes the happenings of interest in the Pulp and Paper Industry—Covers it completely is saying it a little clearer.

To reach buyers in this field, advertising in these columns can carry your message to many that are interested in your products.

As a member of the Audit Bureau of Circulations our circulation claims are not only authentic but provable.

The Paper Trade Journal

10 East 39th St. New York

FOR SALE

All the equipment in the former paper mill of the Baeder Adamson Co., located at Richmond and Alleghany Ave., Philadelphia, Pa., consisting of:

81" trim Pusey & Jones Fourdrinier paper machine. Bird Rotary Screen. Three sets of presses, Millspaugh suction roll, sixteen 36" x 84" dryers double deck. Two stacks of calenders. Two bowl Upright reels, Langston slitter and winder. Marshall drive, driven from variable speed engine and motor.

Beaters—one 1200 lb. capacity Pusey & Jones, wood tub with lightering arrangement and cylinder washer. Two Moore & White 1000 lb. capacity wood tub with lightering arrangement and cylinder washer. One Mills Machine Co.'s 1500 to 1800 lb. capacity iron tub beater with lightering arrangement and cylinder washer. One 1000 lb. capacity Umpherston Iron Tub Beater with cylinder washer.

One No. 1 Claflin Refining Engine with extended base, belt driven from 75 H.P., slip ring induction motor.

One No. 1 Emerson Jordan with flexible coupling, steel filling, directly connected to 75 H.P. Western Electric Induction motor. One Eustis & Jordan jordan with flexible coupling and extended shaft, belt driven from General Electric 100 H.P. induction motor.

One Moore & White 8 x 10 duplex vertical stuff pump. One Pusey & Jones 5½ to 10" vertical duplex stuff pump.

One Taylor Stiles Giant Rag Cutter, 2-15" Cutting knives. One revolving drum rope shredder and duster. Four rotary horizontal cookers approximately 84" in diameter by 22'6" long and 7/16" steel shells, Proctor & Schwartz Drying Oven, two compartments, driven by ¾ H.P., G. E. motor. Complete battery of 4 Norwood Engineering Co.'s Filters with pumps.

All motors alternating current, 3 phase, 60 cycle, 220 volts.

All equipment in this mill complete and in good condition. Immediate delivery can be had and inspection is invited. Equipment for sale at reasonable prices.

Gibbs-Brower Company, Inc.

Paper and Pulp Mill Brokers

401 BROADWAY NEW YORK CITY

Telephone—CANAL 6-8030

OUR MOTTO—*"Service First."*

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Scovell, Wellington & Co.
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ACID FITTINGS (Bronze)
Murray, D. J. Mfg. Co.
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ACID PUMPS
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Oliver United Filters Inc.
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ALUM
Kalbfleisch Corporation, The
Pennsylvania Salt Mfg. Co.
ALUM DISSOLVING JETS
Duiron Company, Inc.
ALUM DISSOLVING SYSTEM
Duiron Company, Inc.
AMMONIA, Anhydrous
Mathieson Alkali Works, Inc.
AMMONIA, Aqua
Mathieson Alkali Works, Inc.
ANALYSIS AND TESTS
Little, Inc., Arthur D.
U. S. Testing Laboratories
APPRAISALS
Chemical Process Inc.
ARCHITECTS AND ENGINEERS
Ferguson Co., H. K.
Ferguson, Hardy S.
Hardy, George F.
Jenssen Company, G. D.
Johnson & Wierk, Inc.
Lefren, K. A.
Orbison & Orbison
Simons, V. D.
Smith, F. L.
Stebbins Eng. & Mfg. Co.
ARTESIAN WELLS
Layne & Bowler, Inc.
ASBESTINE PULP
International Pulp Co.
ASH BUNKERS
Link-Belt Co., The
ASH CONVEYORS
Link-Belt Co., The
ASH GATES (Walter Collecting)
Link-Belt Co., The
ASH HOPPERS
Link-Belt Co., The
AUTOMATIC SCALES
Richardson Scale Co
AUTOMATIC PAPER MAKERS
Ware, Melvin R.
AUTOMATIC WATER FEEDER
Merritt Engineering & Sales Corp., The
BABBITT METAL
Hardy & Sons Co., Wm. A.
BACKING WIRES
Appleton Wire Works.
International Wire Works
Tyler Co., W. S. of America
BAG MACHINES
Heinrich Inc., H. H.
Hudson-Sharp Mch. Co.
BALL BEARINGS
S. K. F. Industries
Timken Roller Bearing Co.
BARIENGER SLEIGH BRAKES
Ryther & Pringle Co.
BARKERS
Appleton Machine Co., The
Green Bay Barker Machine & Tool Works
Valley Iron Works Co.
Waterville Iron Works
BARKING DRUMS
Biggs Boiler Works Co.
Murray, D. J. Mfg Co.
BEARINGS (Tapered Roller)
Timken Roller Bearing Co.
BEARINGS (Thrust)
S. K. F. Industries
Timken Roller Bearing Co.
BEARINGS, ROLLER
S. K. F. Industries
Timken Roller Bearing Co.
BEATING ENGINES
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Pusey & Jones Corp.
Shartle Bros. Machine Co.
Valley Iron Works Co.
BEATER LININGS
Stebbins Engineering & Mfg. Co.
BEATER BARS
Simonds Worden White Co.
BEATER BED PLATES
Dilts Machine Works, Inc.
Horne & Sons Co., J. H.
Simonds-Worden-White Co.
Shartle Bros. Machine Co.
Taylor, Stiles & Co.
Valley Iron Works Co.
BEATER ENGINE BARS
Dilts Machine Works, Inc.
Shartle Bros. Machine Co.
Simonds-Worden-White Co.
Taylor, Stiles & Co.
Valley Iron Works Co.
BEATER HOODS
Bird Machine Co.
Dilts Machine Works, Inc.
Shartle Bros. Machine Co.
BEATER ROLLS
Shartle Bros. Machine Co.
BEATER STOCK RECORDER
Merritt Engineering & Sales Corp., The
BELTING
Gates Rubber Co.
Goodrich Rubber Co.
Goodyear Tire & Rubber Co.
Rhoads & Sons, J. E.
BELT DRIVES
Gates Rubber Company
BELT LACING
Flexible Steel Lacing Co.
BLEACH EJECTORS
Perkins & Sons, Inc., B. F.
BLEACHING APPARATUS
Moore & White Co.
Pulp Bleaching Corp.
BLEACHER LININGS
Stebbins Engineering & Mfg. Co.
BLEACHING POWDER
Mathieson Alkali Works, Inc.
BLEACHING PROCESS
Electro Bleaching Gas Co.
Pulp Bleaching Corp.
BLOW PIPE (Chrome Nickel)
Ryther & Pringle Co.
BLOW PIPING
Moore & White Co.
BLOWERS (CENTRIFUGAL)
De Laval Steam Turbine Co.
General Electric Corp.
Ross Engineering Corp., J. O.
BOARD MACHINES (Insulating)
Oliver United Filters, Inc.
BOND PAPER
Jones, W. L. Inc.
BRASS COLLAPSIBLE SHAFTS
Moore & White Co., The
BREAKER BEATERS
Shartle Bros. Machine Co.
BREAKER BEATER WATER FEEDER
Merritt Engineering & Sales Corp., The
BRUSHING ENGINES
Horne & Sons Co., J. H.
BUCKETS (ELEVATOR)
Link-Belt Co., The
BUNDLING PRESSES
Paper Converting Machine Co. Inc.
BURNERS
Ryther & Pringle Co.
BURSTING TESTERS
B. F. Perkins & Son Co.
Testing Machines, Inc.
CABINETS
Griffith-Hope Co.
CALENDER DOCTORS
Bird Machine Company
Ticonderoga Machine Works
CALCIUM HYPOCHLORITE
Mathieson Alkali Works, Inc.
CALENDER ROLLS
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Norwood Engineering Co.
Perkins & Son, Inc. B. F.
Textile Finishing Mach. Co.
Waldron Corp., John
CALENDER ROLL GRINDERS
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Ticonderoga Machine Works
CALENDERS
Farrel-Birmingham, Inc.
Norwood Engineering Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
Shartle Bros. Machine Co.
CARBON BLACK
United Carbon Co.
CALIPERS (Micrometer Roll)
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
CAR PULLERS
Link Belt Co.
CASEIN
The Casin Manufacturing Co. of America
Kalbfleisch Corp., The
Land O' Lakes
CASTINGS (Brass Bronze, Iron)
Hardy & Sons Co., Wm. A.
Link-Belt Co., The
CASTING (Gray Iron)
Farrel-Birmingham, Co.
Link Belt Co.
CASTING (Chrome Nickel Alloy)
Michigan Steel Casting Co.
CAUSTIC SODA
Diamond Alkali Co.
Mathieson Alkali Works, Inc.
Solvay Process Co.
CAUSTICIZING PLANTS
Dorr Company, The
CENTRIFUGAL MACHINERY (Special)
De Laval Steam Turbine Co.
CENTRIFUGAL REFINERS
Bird Machine Co.
CHAIN DRIVES
Link-Belt Co., The
CHEMICALS, COLORS, ETC.
E. I. DuPont de Nemours & Co., Inc.
Diamond Alkali Co.
Electro Bleaching Gas Co.
General Dyestuff Corp.
Geigy Colour Co., The
Geigy Co., Inc.
Kalbfleisch Corporation, The
Solvay Process Co.
Williams & Co., C. K.
CHEMICAL ENGINEER
Little, Inc., Arthur D.
CHEMICAL (Pulp Mill Equipment)
Jenssen Company, G. D.
Stebbins Engineering & Mfg Co.
CHEMICAL PULPING PROCESSES
Chemical Pulp Process, Inc
CHEMISTS
Little, Inc., Arthur D.
Orthmann Laboratories, Inc.
United States Testing Lab.
CHILLED IRON ROLLS
Perkins & Son, Inc., B. F.
CHROMIUM IRON PLATE
Downingtown Iron Works
CHIPPERS
Murray, D. J. Mfg. Co.
Ryther & Pringle Co.
Valley Iron Works Co.
CHIP BREAKERS
Ryther & Pringle Co.
CHIP SCREENS
Appleton Wire Works
Deister Concentrator Co.
Moore & White Co.
International Wire Works
Ryther & Pringle Co.
CHIP SEPARATORS
Ryther & Pringle Co.
CHIPPER KNIVES
Murray Mfg. Co., D. J.
Simonds Worden White Co.
CHROME PLATE
Chromium Corporation of America
CHLORINE
Diamond Alkali Co.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.
CHUCKS
John Waldron Corp.
CLAY (China)
Edgar Bros. Co.
English China Clay Sales Corp.
Vanderbilt Co., R. T.
CLAM SHELL BUCKETS
Link-Belt Co., The
CLUTCH PULLEYS
Link Belt Co.
Moore & White Co.
CONSISTENCY REGULATOR
Merritt Engineering & Sales Corp., The
CYLINDER MACHINES
Moore & White Co.
CYLINDER PAPER & BOARD MACHINES
Horne & Sons Co., J. H.
CO2 RECORDERS
Cambridge Instrument Co.
COAL CRUSHERS
Farnham Mfg. Co.
COATING MACHINERY
Moore & White Co.
Potdevin Machine Co., The
Waldron Corporation, John
COGS
Bowsher, N. P., The
COLLAPSIBLE WINDER SHAFTS
Moore & White Co.
Murray D. J. Mfg. Co.
COLORS & DYESTUFFS
United Carbon Co.
COLOR MIXING EQUIPMENT
Waldron, John, Corp.
COMBUSTION CONTROL
Cambridge Instrument Co.
COMPRESSORS (Air)
General Electric Co.
Nash Engineering Co., The
Oliver United Filter, Inc.
COMPRESSORS (Centrifugal)
De Laval Steam Turbine Co
CONSERVATORY (Pens)
Horne & Sons Co., J. H.
CONSULTING ENGINEERS
Austin Co., The
Ferguson, Hardy S.
Hardy, Geo. F.
Johnson & Wierk, Inc.
Lefren, K. A.
Little, Inc., Arthur D.
Orthmann Laboratories, Inc.
Ware, Melvin R.
CONTINUOUS BEATER ATTACHMENTS
Bird Machine Company
CONTINUOUS BEATERS
Mid-West Fulton Machine Co
Shartle Bros. Machine Co.
Valley Iron Works Co.
CONTINUOUS BEATER WATER FEEDER
Merritt Engineering & Sales Corp., The
CONTROLLING INSTRUMENTS
Merritt Engineering & Sales Corp., The
CONTROLS (Electric)
Cambridge Instrument Co.
Cutler-Hammer Mfg. Co.
CONVEYOR WEIGHTS
Richardson Scale Co.
CONVEYORS
Caldwell & Son Co., H. H.
Farnham Mfg. Co.
Link-Belt Co., The
Murray, D. J., Mfg. Co.
Ryther & Pringle Co.
CONVEYORS (Trim)
Ross Engineering Corp., J. O.
COOKING & RECOVERY PROCESS
Ross Engineering Corp., J. O.
Stebbins Engineering & Mfg Co.
CORES
Wood Products Co.
CORES (Paper)
Elixman Paper Co.
CORES (Steel)
Fabricated Steel Products Co.
CORE MACHINES
Hudson-Sharp Mch. Co
COST ENGINEERS
Scovell, Wellington & Co
COTTON CALENDER ROLLER
Norwood Engineering Co
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.
COUCH ROLLS
Americas Wringer Co.
Moore & White Co.
Shartle Bros. Machine Co
COUPLINGS
De Laval Steam Turbine Co
Link-Belt Co., The
CREPING MACHINES
Gibbs-Brower Co., Inc.
Hudson-Sharp Mch. Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.

CUT-OFF SAWS
Murray, D. J. Mfg. Co.
CYLINDER COVERS
Wisconsin Wire Works
CYLINDER, RAILROAD AND DEVIL DUSTER
Moore & White Co., The
CYLINDER DRIVES
Moore & White Co., The
CYLINDER MOULDS
Glens Falls Machine Co.
Shartle Bros. Mach. Co.
CYLINDER VALVES
Green Bay Foundry & Mach. Works
CYLINDER WIRES
Appleton Wire Works
International Wire Works
DAMPENERS
Norwood Engineering Co.
Perkins & Sons, Inc., B. F.
DANDY ROLLS
Wisconsin Wire Works
DECKERS
Bird Machine Company
Glens Falls Machine Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.
Valley Iron Works
DENSITY REGULATOR
Merritt Engineering & Sales Corp., The
DIE CUTTERS
Appleton Machine Co., The
DIGESTER FITTINGS
Duriron Company Inc., The
Michigan Steel Casting Co.
Stebbins Engineering & Mfg. Co.
DIGESTER LININGS
Stebbins Engineering & Mfg. Co.
DIGESTERS (Sulphate and Sulphite)
Downingtown Iron Works, The
DISC BARKERS
Waterville Iron Works
DISPENSERS
Griffith-Hope Co.
DOCTORS
Bird Machine Co.
DOCTOR BLADES
Bird Machine Company
DRIVES (Paper Machinery)
Bird Machine Co., (Pulmax Drive Div.)
Farrel-Birmingham, Co.
Link-Belt Co., The
Shartle Bros. Machine Co.
DRIVES (SHORT CENTER)
Bird Machine Co., (Pulmax Drive Div.)
Link-Belt Co., The
DRIVES (Spiral)
Link Belt Co.
Philadelphia Gear Works
DRYER EXHAUSTS
Nash Engineering Co., The
DRYER DOCTORS
Bird Machine Company
DRYER JOINTS
Shartle Bros. Machine Co.
DRYERS
Horne & Sons Co., J. H.
Shartle Bros. Machine Co.
DRUM WINDERS
Hudson-Sharp Mch. Co.
DRYING SYSTEMS
Pickles, W. F.
Ross Engineering Co., J. O.
Stickle Steam Specialties Co.
Waldron Corporation, The
DUSTING MACHINERY
Jones & Sons Co., E. D.
Norwood Engineering Co.
DYES, (ANILINE)
General Dyestuff Corp.
Heller & Merz
Geigy Colour Co., The
ELECTRIC EQUIPMENT
Cutler-Hammer Mfg. Co.
General Electric Co.
ELEVATORS
Caldwell & Son Co., H. H.
EMBOSSING CALENDERS
Norwood Engineering Co.
Perkins & Sons, Inc., B. F.
Textile Finishing Machinery
EMBOSSING MACHINES
Paper Converting Machine Co., Inc.
John Waldron Corp.
EMBOSSING MACHINE (Napkin)
Paper Converting Machine Co.
John Waldron Corp.
ENGINEERS
Dorr Company
Layne & Bowler, Inc.
Little, Inc., Arthur D.
Orthmann Laboratories, Inc.
ENGINES (STEAM)
Murray Iron Works
ENVELOPE MACHINES
Potdevin Machine Co.
ESTIMATES
Chemi-pulp Process Inc.
EVAPORATORS
Murray, D. J. Mfg. Co.
EXTRACTORS
Valley Iron Works Co.
FANS
Ross Engineering Corp., J. O.
FAN PUMPS
Lawrence Mach. and Pump Co.
Moore & White Co.
Valley Iron Works Co.
FANS (Ventilating)
Perkins & Son, Inc., B. F.
Ross Engineering Corp., J. O.
FEED WATER HEATER
Stickles Steam Specialties Co.
FELT CARRIER ROLLS
American Wringer Co.
FELTS AND JACKETS
Appleton Woolen Mills
Bulkley, Dunton & Co.
Draper Bros. Co.
Fitchburg Duck Mills
Huyck & Son, E. C.
Lockport Felt Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Turner, Halsey Co.
Waterbury Felt Co.
FILTERS
Deister Concentrator Co.
Filtration Engineers, Inc.
Glens Falls Machine Works
Inversand Company
Moore & White Co.
J. O. Ross Engrg. Corp.
Oliver United Filters, Inc.
FILTER WIRES
Appleton Wire Works
Oliver United Filters Inc.
FILTERING SYSTEMS
Hungerford & Terry, Inc., The
Norwood Engineering Co.
Oliver United Filters Inc.
FIXTURES (Towel, Toilet, Napkin)
Grimth Hope Co.
FLAT SCREENS
Bird Machine Company
Glen Falls Machine Co.
FLEXIBLE COUPLINGS
De Laval Steam Turbine Co.
Jones Foundry & Machine Co., W. A.
Link Belt Co.
John Waldron Corp.
FLOOR TILE (Non-Slip)
Norton Co.
FLOW METER
General Electric Co.
FLY BARS
Jones & Sons Co., E. D.
FOLDING MACHINES (Single Type)
Norwood Engineering Co.
FOLDING MACHINES
Paper Converting Machine Co., Inc.
Waldron, John, Corp.
FOLDING TESTERS
Testing Machines Inc.
FOURDRINIER WIRES
Appleton Wire Works
Eastwood Corporation
International Wire Works
Neumeyer & Dimond
Wisconsin Wire Works
FOURDRINIER WIRES (Rolled)
Wisconsin Wire Works
FREENESS TESTERS
Testing Machines, Inc.
FRICTION CALENDERS
Norwood Engineering Co.
Perkins & Son, Inc., B. F.
FRICTION CLUTCHES
Link-Belt Co., The
Moore & White Co.
GEARS
De Laval Steam Turbine Co.
Link-Belt Co., The
GEARS (Machine Cut)
De Laval Steam Turbine Co.
Limited, Charles
Link-Belt Co., The
GEARS AND PINIONS
Link-Belt Co., The
Moore & White Co.
GENERATORS
De Laval Steam Turbine Co.
General Electric Co.
GRANITE PLATES
Green Bay Foundry & Mach. Works
GRANITE ROLLS
Perkins & Son, Inc., B. F.
GREASES
Vacuum Oil Co.
GREY IRON CASTINGS
Rythar & Pringle Co.
GRID UNIT
Murray Mfg. Co., D. J.
Unit Heater & Cooler Co. The
GRINDER VALVES
Glens Falls Machine Works
GRINDING WHEELS
Norton Co.
GROUND WOOD
Borregaard Co., Inc.
GUIDES (Automatic Web)
John Waldron Corp.
GUIDES (FELT)
Moore & White Co.
Shartle Bros. Machine Co.
GUMMED TAPE TESTERS
Thwing Instrument Co.
GUMMING AND GLUING MACHINERY
Potdevin Machine Co.
Shartle Bros. Machine Co.
Waldron Corporation, John
GUMMED SEALING TAPE
Paper Manufacturers Co.
HANGERS
Link-Belt Co., The
HAND TRUCKS
Fairbanks Co.
HEATERS (Unit)
J. O. Ross Engrg. Corp.
HEATING AND VENTILATING SYSTEMS
Ross Engineering Corp., J. O.
Stickles Steam Specialties Co.
HIGH DENSITY THICKENERS
Oliver United Filters, Inc.
Moore & White Co.
HOISTS (ELECTRIC)
General Electric Co.
HYDRAULIC MACHINERY
Farrel-Birmingham, Co.
HYDRO-ELECTRIC DEVELOPMENTS
Johnson & Wierk, Inc.
Smith S. Morgan
HYDRAULIC TURBINES
De Laval Steam Turbine Co.
Smith S. Morgan
HYDROGEN-ION APPARATUS
Cambridge Instrument Co.
HYGROMETERS, PAPER STOCK
Cambridge Instrument Co.
HYGROMETER
Testing Machines, Inc.
INSPECTIONS
United States Testing Co.
INTERFOLDING MACHINES
Paper Converting Machine Co., Inc.
JORDAN ENGINES
Appleton Machine Co.
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Shartle Bros. Machine Co.
Valley Iron Works
JORDAN FILLINGS
Bahr Bros. Mfg. Co., The
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Shartle Bros. Machine Co.
Valley Iron Works
KNIVES, ETC.
Dilts Machine Works, Inc.
Simonds-Worden-White Co.
Shartle Bros. Machine Co.
Taylor Stiles & Co.
KNOT SAWING MACHINES
DeZurik Shower Co., The
KNOTTERS
Glens Falls Machine Co.
KRAFT PAPER
Jones, W. C., Inc.
LABORATORY EQUIPMENT
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works
LACING, BELT
Flexible Steel Lacing Co.
LAY BOYS
Moore & White Co.
LIME MUD FILTERS
Oliver United Filters Inc.
LIQUID CHLORINE
Electro Bleaching Gas Co.
Kalbfleisch Corp.
Mathieson Alkali Works, Inc.
LOG HAULS
Rythar & Pringle Co.
LOFT DRYERS
Ross Engineering Corp., J. O.
John Waldron Corp.
LUBRICANTS
Vacuum Oil Co.
METALLIC PACKING JOINTS
Reliable Machine Co.
MIMEOGRAPH PAPER
Jones, W. L., Inc.
MOTORS
General Electric Co.
NAPKIN FOLDING MACHINE
Paper Converting Machine Co., Inc.
Waldron, John, Corp.
NAPKIN DISPENSERS
Griffith-Hope Co.
NON-CORROSIVE METALS
Duriron Company Inc., The
OILS AND GREASE
Vacuum Oil Co.
OPERATING SURVEYS
Chemical Process Inc.
PACKING
Green Tweed & Co.
PAPER BAG BUNDLING MACHINERY
Potdevin Machine Co., The
PAPER BAG MACHINERY
Heinrich Inc., H. H.
Potdevin Machine Co.
Smith & Winchester Mfg. Co.
PAPER BAG MACHINERY (ALL TYPES)
Potdevin Machine Co., The
PAPER BREAK RECORDERS
Thwing Instrument Co.
PAPER CUTTERS
Hamlet Machine Company
Inman Manufacturing Co.
Moore & White Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co.
PAPER CALENDER ROLLS
Perkins & Son, Inc., B. F.
PAPER CORES
Climax Tube Co.
PAPER DAMPENERS
Perkins & Son, Inc., B. F.
PAPER GUILLOTINE
Heinrich, Inc., H. H.
PAPER DUSTERS
Moore & White Co.
PAPER MANUFACTURERS
Brown Company
Kalamazoo Vegetable Parchment Co..
Oxford Paper Co.
West Virginia Pulp & Paper Co.
PAPER MACHINE HOODS
Ross Engineering Corp., J. O.
Stickles Steam Specialties Co.
PAPER MILL SUPPLIES
Castle & Overton, Inc.
PAPER AND BOARD CUTTERS
Horne & Sons Co., J. H.
PAPER AND PULP MACHINERY
Appleton Machine Co.
Beloit Iron Works
Bird Machine Co.
Black-Clawson Co.
Davis, Frank H.
Clark-Aiken Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Glens Falls Machine Co.
Green Bay Foundry & Mch. Works
Horne & Sons Co. Inc. J. H.
Lobdell Car Wheel Co.
Moore & White Co.
Paper & Textile Machinery Co.
Perkins & Son, Inc., B. F.
Pusey and Jones Corp.
Rice Barton-Falen, Inc.
Rythar & Pringle Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
PAPER AND PULP MILL BROKERS
Gibbs-Brower Co.
PAPER ROLL PLUGS
Wood Products Co.
PAPER SCALES
Testing Machines, Inc.
Thwing Instrument Co.
PAPER STOCK DEALERS
Castle & Overton, Inc.
PAPER STOCK WASHERS
Jones & Sons Co., E. D.
PAPER SCREENS
Bird Machine Company
Shartle Bros. Machine Co.
PAPER TESTERS
Perkins & Son, Inc., B. F.
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works Co.
PAPER TRIMMING KNIVES
Simonds-Worden-White Co.
PAPER TUBE MACHINERY
Dietz Machine Works
Potdevin Machine Co., The
PAPER WAXING MACHINERY
Gibbs-Brower Co.
Potdevin Machine Co.
Waldron Corporation, John
PENESCOPE PENETRATION TESTER
Thwing Instrument Co.
PENSTOCKS
Biggs Boiler Wks.
PERFORATING MACHINES
Dietz Machine Works
Waldron, John, Corp.
PERFORATED METAL
Harrington & King Perforating Co.

Mundt & Sons, Charles

PLATING, CHROMIUM
Chromium Corp. of America
Norwood Engineering Co.

PLATERS
Perkins & Son, Inc., B. F.

PLAYING CARD MACHINERY
Waldron, John, Corp.

PLUGS
Wood Products Co., Inc.

POWER TRANSMISSION EQUIPMENT
De Laval Steam Turbine Co.
Link Belt Co.

PRECISION INSTRUMENTS
Testing Machines, Inc.
Thwing Instrument Co.

PRESSES (Napkin)
Paper Converting Machine Co.

PRESS ROLLS
American Wringer Co., Inc.
Appleton Machine Co., The
Baker Manufacturing Corp.
Goodrich Rubber Co.
Horne & Sons Co., J. H.
Shartle Bros. Machine Co.
Valley Iron Works Co.

PRESS ROLL DOCTORS
Bird Machine Company

PRESS ROLLS (Granite)
Perkins & Sons, Inc., B. F.

PRESSURE CONTROL SYSTEMS
Link Belt Co., The
Stickles Steam Specialties Co.

PRINTING MACHINES
Heinrich, Inc., H. H.
Hudson-Sharp Mch. Co.
Waldron, John, Corp.

PRINTING PRESSES
Paper Converting Machine Co., Inc.

PULLEYS
Link-Belt Co., The

PULLEYS (Semi-Steel)
Link Belt Co.

PULP AND PAPER MACHINERY
Horne & Sons, Co., J. H.

PULP & PAPER MILL MACHINERY
Paper & Textile Mach. Co.
Pusey and Jones Corp.

PULPSTONES
Norton Co.

PULP DECKERS
Bird Machine Company
Filtration Engineers, Inc.

PULP GRINDERS
Glens Falls Machine Works
Green Bay Barker Machine & Tool Works

PULPS (KRAFT)
Borregaard Co., Inc., The
Lagerloef Trading Co., Inc.

PULP PRESSES
Farrel-Birmingham, Co.

PULP SCREENS
Bird Machine Company
Trimbey Machine Works

PULPS (SULPHITE)
Lagerloef Trading Co., Inc.

PULPS (MECHANICAL)
Lagerloef Trading Co., Inc.

PULP TESTING
Little, Arthur D
U. S. Testing Co.

PULP THICKENERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Co.
Moore & White Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.

PULP WASHERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Works
Oliver Continuous Filter Co.
Pulp Bleaching Corp.

PULP WOOD CHIPPERS
Waterville Iron Works

PUMP PRIMERS (Steam and Water Jet)
Appleton Machine Co., The
Lawrence Mach. and Pump Co.
Shartle Bros. Machine Co.
Valley Iron Works Co
Warren Steam Pump Co.

PUMPS (Acid)
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.

PUMPS (Acid Centrifugal)
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.
Lawrence Mach. & Pump Co.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Oliver United Filters Co.
Shartle Bros. Machine Co.
Valley Iron Works
Warren Steam Pump Co.

PUMPS (Centrifugal)
Layne & Bowler Inc.
Moore & White Co.

PUMPS (Deep Well)
Layne & Bowler Inc.

PUMPS (Rotary Cycloidal)
Lawrence Mach. and Pump Co

PUMPS (Stuff)
De Laval Steam Turbine Co.
Lawrence Mach. & Pump Co.
Frederick Iron & Steel Co.
Moore & White Co.
Nash Engineering Co.
Shartle Bros. Machine Co.
Valley Iron Works Co.
Warren Steam Pump Co.

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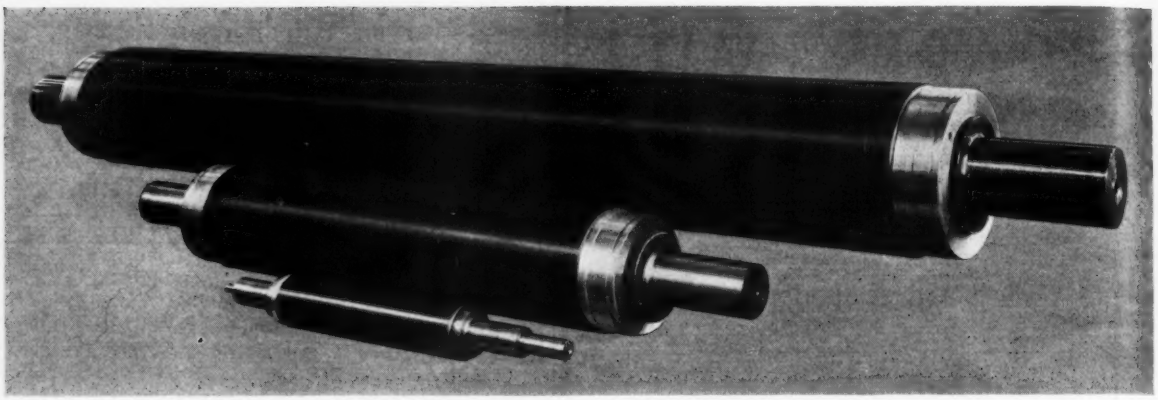

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